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Sharing Common Sense for More Cents per Common Share

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Many of the elements inherent in the techniques of industrial engineering, production planning and industrial accounting are basically similar and can be likened to bits of applied management common sense. This article focuses attention upon the potential profit pluses that can often come about through the sharing of these common sense factors by combining the clerial methods and procedures in the routine application of the three skills to work-a-day plant administrative practices. It is implied that a qualified industrial accountant is the most natural person to bring about synchronization of these common-sense elements. This can only result in additional cents of profit per common share, the true objective of the techniques involved.

ONE COMMONLY OVERLOOKED AVENUE of increasing profits is to effectively combine the clerical methods and procedures of industrial engineering, production planning, materials control, and industrial accounting for the maximum support of plant management. Two benefits follow. A minor profit plus results from a decrease in clerical expenditures through such combinations, primarily through proper systems and procedures which utilizes the common factors and objectives of the separate techniques. A major profit plus results from increased efficiency of operations brought about by the free sharing of the common sense factors among these techniques and the better team play of these now better informed groups.

Of course, the degree of common sense sharing in any specific situation is dependent upon factors such as whether the organization has been developed to separate line and staff functions, the size of the plant or plants, the complexity of products and/or operations, the quality of techniques used, and the competence of technical personnel. A major factor affecting application

of this sharing is the number of pressures, quite often foreign to production problems, facing plant managers. Excessive pressure on a plant manager is quite often partly relieved by delegating about 90 per cent of the immediate and short-term production responsibility and about 50 per cent of the long-term planning to an assistant plant manager. However, the plant manager who delegates such large portions of his line production problems, still has others. Anywhere from six to twelve so-called technical or administrative units report directly to him. These separate units may have varying degrees of inter-relationship, some central staff complexity, and may have internal problems of their own.

This article proposes a more direct and positive approach to the problem than many of the current writings, which hint at the solution and touch tenderly upon it about the edges. Of course, it is much easier to recommend the direct approach to the sharing of common sense and the combining of application features of systems in which the various techniques take form, than it is to actually accomplish these objectives. However, unless these system elements are brought together harmoniously, there will remain profit cancers or ulcers in the parasitical forms of confusion, delay, friction, duplication, and just plain absence of good team play. We are dealing with people, in fact, groups of specialized people who have long had individual fences around their specialties and have long enjoyed the popular concepts of their own prestige, prerequisites and prerogatives.

Industrial Accountant Should Take the Initiative

Who is to give first in this breaking down of fences? By all means the industrial accountant. He holds in a sense the hour glass through which all information eventually flows. His vantage point in understanding the overall problem in his directive to act first. He can do so in discharge of his regular duties. His very wide field of contacts and influence in application of accounting techniques designed first for operators and second for bookkeeping, are the avenues for spreading the sharing-common-sense philosophy. But it is no easy task. Ritual, form, dogma, assumed prestige, and doubtful prerogatives prevail in relationships in nearly all technical or semi-technical fields. This makes it awkward and difficult, at times, to see the similarity of content and basic common sense in each of them. In fact, accountants, themselves, have been quite successful for years in cloaking the utter simplicity of bookkeeping behind some pretty high-sounding and mysterious terms and artifices—have succeeded in mystifying and confusing management in so doing.

However, assuming accountants are sincere and qualified, have placed bookkeeping in its proper corner, have rightfully segregated and emphasized the skills of tax, fiduciary and financial accounting, have learned the basic elements of profit planning, control accounting, systems and procedures (as well as some of the kindred skills of industrial engineering and production planning) and understand some of the problems of production people and can speak their language—assuming these things, accountants have about reached the stage at which they can propagate common sense. Not before are they in the most logical position to act as the catalyst to bring about the sharing of common sense under discussion in this article.

A Scramble of Intangible and Tangible Factors Confronts Us

Let us light up the opium pipe and, in the dream smoke, follow an imaginary case in point. We will deal in brief and general fashion with only the clerical methods, systems and procedures and will leave aside the touchier phases of organization, job titles, salary evaluation and actual combinations of technical functions. These all, of course, vary greatly with specific circumstances. We will take a "before and after" trip and, during both, will maintain an inquisitive attitude. On our "before" trip through the usual separated-unit setup, you (who accompany me in imagination) will be asked to do three things:

1. Paint all persons engaged in the issuance of the output of industrial engineering red; those who plan or schedule production, white; those who control materials, blue; and those who are engaged in industrial accounting, green.
2. Count all persons engaged in the four separate areas.
3. Be observant of just what the separate units and the people in them are doing, the source data they work from, the form and quantity of their output, to whom and where it goes, and what these recipients do with it.

Many obvious flaws will be revealed. Neither the supervision nor the working units of the four groups are physically located in the best relationships to each other or to the productnon people they serve. We immediately detect a lack of the sharing of common sense factors, see extra copies of data filed in several units, and notice the lack of corridor and shower bath contacts usually associated with good team play. Much of the detail work and the source data seems to be quite similar, without clear or consistent usefulness. A large part of it seems of questionable value. Some is downright superficial and even detrimental. For example, three complete inventory records stand out like sore thumbs. We sense that much of the data is far, far away from the field of production problems. Despite the management guides which spell

out the production planning responsibility for production and inventory counts, the accountants are using many different results and continually imply they can not trust the figures the production unit develops. The accountants complain that they always get the blame for inventory adjustments and have to do the overtime work to verify the figures and make the changes in the records. Only a portion of the standards issued by the industrial engineering unit are direct to products in the form of route sheets. This causes accountants to search through masses of improperly indexed tables of standards. The accountants admit that, sometimes, even the best of them arrive at different costs for the same products and select the wrong standards to evaluate performance.

In some areas the production planning people do not even have copies of the current standards. They explain this by saying the sheets are hard to read and, anyway, they have to use their own "round-house" averages to schedule with. In these areas, they have long used an "average representative unit quantity" for activity reporting, instead of standard machine hours produced, despite extreme complexities in type, size and quantity lots of products produced. Production planning staff only "loosely" schedules what they call "bottleneck machines," pays too little regard to standard method routings, and quite often has the same machines running at overtime rates on Saturdays and Sundays, which are idle on straight-time during week days. They do not even have copies of the flexible budget standards for indirect expenses and have made no attempts to compute indirect allowances before scheduling production.

Some of the standard setting by the engineers seems to be of the "alibi," "incident" or "work done" type. They seem reluctant to accept the management responsibilty part of engineering, which would require them to set methods standards. They hestitate to aid management by applying engineering skills and judgment to the setting of standards for the control of the number of incidents to be included in the standard method to make (the economics of the way management decided to be in business) as well as the work done standards for performance of each incident. The remark by one engineer to the effect, "This is the way we issue standards and I don't care how production planning or industrial accountants use them or what Joe does the actual work—that's it," certainly does not indicate the sharing of common sense.

Anyone who has worked a few years in companies with complex operations would recognize some common symptoms in the points noticed above. It would only be fair, in contemplating the situation described, to suspect that the industrial accountant is the office type and does not think it an

essential part of his job to associate too closely with the shop boys, engineers, or production planners. He seems more interested in books and figures, and, because nobody hits him over the head with a club to improve his effectiveness to operating people, he thinks he is doing some real good accounting.

Usual Complexity of Tangible Production Problem Factors

Among the working notes we took on our trip may be the following items:

1. The product lines are complex, with some stock products, some special products of the repeat-order type (which may or may not be reordered—or may or may not, if reordered, be of the same design) and some strictly one-time-deal special products, and all products are both produced and sold in many quantity lot brackets.
2. Part of the operating department's work on individual orders and others process combinations or group layouts. The products require from four to ten distinct operations in any mixture and nearly all products can be produced on at least two or more different machines for most operations. This depends on backlog, service required, special features of the product or order, itself, and also the mix of orders on hand.
3. Recent activity reflects an average of 44 orders per day of a type which average less than six operations per order. There are 90 separate machines in the plant and they all can and will work three shifts per day. The company tries to operate on a five-day week and make definite work schedules for a two-week period, assuming all beyond as backlog still to be scheduled.

In short, we can sum up by saying that what we saw was somewhere near the average we might find if we looked in the "dirty linen" closet of any number of outfits at the same time relative to the process of their development. The stage of development involved is the one at which the separate technique groups each are reasonably well developed in their own areas and are following the broad patterns of their specialized fields as they are spelled out in the applicable literature. However, since we were specifically looking for the sharing of the common sense which each develops, we have had to admit at the close of our "before" trip, that there seemed to be much room for improvement. Apparently, communications between the various units' functions, responsibilities, and systems is not as open as the Canadian and United States border! There seemed to be an unrealized tinfoil (not quite iron) curtain here and there.

The Scramble Is Unscrambled by Intercommunication of Common Sense Factors of Purpose

So much for the "was" situation. We request a genie to instantly transfer the separate unit setup to the desired share-the-common-sense status and to combine and place in proper contiguity and sequence all clerical methods,

systems, and procedures applicable to the output of the separate techniques as related to the working conditions of the mythical plant. Then we rest a bit, take another puff on our dream pipe, refill our four paint buckets and start our "after" trip through the plant

The first reaction is that our short rest was unnecessary, for now we do not have to do much walking to see the whole picture. The supervisors and Class A technicians of industrial engineering, production planning, and industrial accounting are located in separate offices immediately adjacent to each other, with half-glass partitions permitting both constant vision and opportunity to voice the interchanges of their respective elements of applied common sense. Materials control has been absorbed into the production planning unit and the waste control unit, separate before, is now an integral part of industrial engineering. But where is everybody else—all those people we painted different colors on our first trip?

We paint the few specialists in the three offices red, white, and green. With the elimination of material control as a separate unit, there are no blues. Following directions, we proceed to a nice, large, adequately lighted room, adjacent to and with full vision of the two major producing units of the plant. The room, itself, has a pleasant air of efficiency. Most of the people working seem to move about quite a bit. Only a few are sitting for long periods at any one location. On the whole, they seem more interested in their work than during our former trip. As they scuttle about here and there, they have an air of satisfaction about them and there is the appearance of understanding upon their countenances, an air of definiteness, certainty and purpose in their movements.

Their actions resemble that of a football team practicing precision plays or a championship drill team going through its maneuvers. A light camaraderie seems to exist in the contacts and exchanges of words and papers amongst the group. They seem to be at once "on their toes" and at rest, somewhat like a group of ball players playing pepper ball before a game. Also, they seem to be working and watching a moving thing or things, somewhat like a group racing toy automobiles. We sense a continuing flow of process, yet it is apparent that parts of it are stopped and re-started at various intervals.

The items with which the room is equipped are businesslike but not wholly "officy." There is a definite order to its arrangement. At one end is a receiving table for orders, then a file of standard cards, then a calculating machine, then a big schedule board labeled "backlog." This has chart-type loading indicators and also pocket or bucket-like receptacles for each machine type. Next there are several working layout tables and a calculating machine.

Beyond these are several loading schedule boards labeled "two week work schedule" by individual machines grouped by type. In front of each group of schedule boards, with adequate working space between, is what appears to be at once a miniature plant and a tub file. Each miniature machine has several receptacles for various cards. Upon examination, these are to receive the order job cards for work ahead, work being done, and work finished. There are separate card sets for each job, broken to make ready, run, repair, and idle. Scanning the chart, we see the machine loadings and scanning the miniature plant tub file a glance tells us which machines are producing, making ready, being repaired, or idle. At the end of the miniature plant tub files, which are positioned by machine type groups, is a separate file labeled "finished goods."

Orders come in at one end, production reports come in at the middle, shipping sheets and bills of lading go out the other end. New or changed standards are brought in from time to time. Schedules for machines go out and a minimum of control reports are pulled off the cards in the receptacles.

The most surprising thing about it is that the arrangement seems to work and everybody is talking a mingled jargon of operators talk, supervisors talk, waste control talk, industrial accounting talk, flexed budget talk, and various reporting talk. Most of the words used are nontechnical. However, the few technical terms which are used so co-mingle the separate techniques as to verify that here there has been a complete sharing of the common sense factors. Our new notes skeletonize the sequence of operations as follows:

1. Orders received are taken immediately to the standards and/or quotation file. Standards have been issued by engineers to fit the system. Machine hours, materials, tools, dies, etc., are computed on individual order cards, backlog chart posted, date to schedule to meet shipping date noted, and order filed in backlog pockets, materials and tools cards passed to expeditor's position.
2. At schedule time, orders to be processed individually are scheduled from last operation to first with due regard or shipping dates, make-ready orders are prepared, charts posted and order cards filed in "ahead by machines."
   On orders to be partially produced in combinations, one of two operations schedulers must initially test schedules from last to first, and first to last. The object is to equal the sum of the individual order standards in the layout summary or take the most gain or least loss. At this point the layout man computes such variances as nonstandard methods, combination, make-ready, material usage and others for both machine utilization and materials. When completed, the machine load chart is posted, order cards filed in miniature plant pocket "ahead" and layout variance report on scheduled quantity turned in.
3. As machine schedules are firmed up, the flexible budget allowances for indirect expenses are prepared.
4. Machine reports to fit the system report actual performance. These are posted to order followup cards in the miniature plant pockets upon completion of each job or shift. Variances are computed almost instantly on actual quantities and appropriate reports issued. Some indirect items are computed daily and some weekly, using the same sheet the pre-scheduled allowances were issued on.
5. The last station is finished goods, to which shipments are posted and standard costs drawn off. The in-process inventory is always present in the receptacles.

Other than schedules and variance reports, only two significant operating items are required. One is machine loads and the other is information on orders which might not meet shipping date. These are constantly at hand, in fact, in multi-plant operations a photograph of the two schedule boards—working and backlog—sent to the central office, is an ideal report.

Inasmuch as all paper work factors have been synchronized and systematized, the aggregate work is greatly reduced from former methods. Many of the common sense elements have been shared. We couldn't find one single person in this "nerve center" we could paint only one color—red, white or green. The clerical methods of the various techniques were so inter-twined that nearly everyone had to be painted with all three colors, and the few remaining ones with two colors. The total people were significantly less than on our first trip.

The industrial accountant commented that the miniature plant tub files, with all variances almost on a perpetual balance basis, permitted issuing the modern type flexible-budget-tied-in-cost-recovery monthly operating statement by the third working day, with full commentary letter on overall performance by the plant manager. However, he implied that the plant people did not pay too much attention to the monthly report, for it only summarized what most plant people knew before it happened, while it was happening, or immediately after it happened. Even volume variance was estimated in advance from machine loadings. The reports are necessary to summarize results for the records and for the central office but, in the plant, they pretty well know when they make ten yards, are penalized five, fumble, intercept a pass, or make a touchdown.

Features of the Solution

The plant manager chuckled when he implied that before they had "shared the common sense" there were many things happening "all over the place" that no one seemed "to just get their hand on." Even if someone did spot a difficulty, he couldn't communicate to the right spot in time to do much about it. The plant manager implied that he would never be as much of a theorist or a perfectionist as to believe that he (or any plant manager) could "catch all the fish in the sea," but, he said, since the innovation of common sense sharing, he felt there were "darn few big ones" which eluded his administrative gang of fisherman. He admitted that there was some nervousness and friction among those who were standing on prerogatives, when they started to break down fences. He summed the change up by guessing that all he had

done was to decentralize some of the common sense inherent in his administrative units. He said that it is surprising how many simple basic factors of common sense are now shared by everyone, which used to be handled almost as "top secret" documents.

Another effect of the combining of skills was emphasized by the plant manager, industrial engineer and the industrial accountant alike. It seemed that there was much more stability and much less criticism and fussing around about annual operating budgets, standard product cost, and estimated product cost data emanating from the plant. All items relating to budget allowances for expenses, used for evaluation of efficiencies of expenditure and entering into charging rates for costing purposes, as well as all standard elements such as machine speeds, waste, crew size, etc., are handled on a formal revision-of-standards basis. Hence the company is on an "approved revision basis" at all times and all understand that this is really a built-in cost control and reduction program.

Much of the bickering with estimating people and sales personnel about product costs has disappeared. All are aware of the effects of the little items of common sense on the costs. This feeling of confidence has permitted factual price-cost-profit relationships by products to be developed and the benefits seem to be felt throughout the entire company. We used to malign the sales people about the prices they got and they retaliated by saying our costs were poor. Now we meet as equals across the negotiating table. "Another thing," the plant manager drawled, "we used to have a tremendous job of training people, due to our rapid expansion and ever-increasing complexity of product lines and product derivatives. Now we require every operating supervisor, from the smallest working unit leader up to the plant manager, to spend enough time in the 'nerve center' to understand what takes place there *before* he goes on his job as supervisor. In this way, he gets the feel of the overall operation, knows his part in it, knows what the stuff he feeds into the center is for, knows what they do with it there and why, knows what he gets back out of it and what it means to him and his group. Further, all male white collar workers, regardless of grade or position, are required to go through the 'nerve center' before they are put on their jobs.

"You know, it's remarkable," the plant manager added, "how quickly and painlessly we can train and develop all our people now. Know why? I think it is because now we can show them in a way they can understand, just what spot they are to fill, why and how, and, besides knowing their part on the team, they all know what the others are doing and how their parts fit in. In other words, we are actually just 'sharing common sense' in a way they can understand it."

In conclusion, as our dream pipe goes out and the picture in the smoke fades, I think our imaginary "before" and "after" trips briefly reported on above, give a certain amount of credence to our original premise that there are two major potential sources of additional cents per common share from the process of sharing the common sense in the several management technique areas discussed:

1. Reduced clerical expenditures.
2. Increased efficiency through understanding, communications, and team play.

I personally feel it is an intrinsic part of the function of good industrial accountants to break their own fences down first and be the concealed sparkplug to accomplish this sharing of common sense within all areas of their sphere of operations.

Budgetary Planning — Yesterday and Today

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The acceptance of budgets is widespread and consequently most articles deal with the details of budgets in action. Here the author describes, with historical reference, the development of the budget concept from its inception in business, through various phases, to its present advancement. This article provides needed perspective on the standing of budgets in the business world.

THERE HAVE BEEN a number of major changes in the area of business planning over the past five decades but, in no other single activity, has the change been more pronounced than in the field of budgetary planning. The changes here have been of real significance and most of them have occurred in the short space of the last ten to twenty years. Budgeting is, basically, only a plan of operation, and even the most rudimentary business effort has to be motivated by some type of plan. However, although always essential and present in some form (not always recognizable as such), it was not until the period following the first world war that budgeting began to acquire any real stature in the business world. Businessmen began to realize that some form of overall planning was sorely needed if they were to regulate business activity.

As could be expected, the acceptance of budgets first occurred in certain of the large and progressive business firms throughout the country. They came to realize that the complexities and imponderables of business made their operations particularly suitable for budgetary applications. The smaller companies and many of the larger ones were still content to rely on the "strong executive management" concept, i.e., a management capable of calling the turn—intuitively or by observation—on a day-to-day, even hour-to-hour, basis. This, after all, was the philosophy upon which such organizations had been founded and had flourished for many years. They were not apt to be in any big hurry to change. But, as time moved on, the shallowness of this philosophy became more and more evident. There were warning signs flashing on all sides, but their message never quite got through in prosperous times. It took the final bleak days of 1929 to finally crystallize attention on the folly of this short-term business concept.

Early Mis-Applications of Budgetary Control

With the economic apathy that spread through the country in the 1930s, there came also a reawakening of the interest in budgets and in financial plan-

ning. Businessmen, large and small, began to cast feverishly about for some panacea, some cure for their economic ills. To many of them budgets became a made-to-order answer to all their problems. Overnight, budget controls became the launching platform for arbitrary reductions of personnel, for the expansion of supervisory work loads, for ill-planned and unrealistic cost reduction programs, and for many other restrictive practices. In such a climate, it is not hard to understand why budgeting became enshrouded in an aura of negativeness.

To supervisors and second line executives the country over, the budget became a symbol of oppressive action, the focal point for many an unpleasant business memory. To one man, it became the reason for not getting that well-deserved raise. To another, it was identified as the reason for not being able to make needed repairs to a plant or equipment. To a great many operating supervisors, even those at top management level, it became an instrument of evil influence, something to be long regarded with suspicion and distrust. Unfortunately, a great deal of that distrust is still in evidence. Much of the resistance to budget theory today stems from this initial period. Many still regard budgets as a medium of restriction. As someone so ably has put it, budgets have the same connotation as "Monday morning school bells" and as the "Saturday night curfew."

Planning Is Added—and Acceptance Grows

The advent of the second world war brought another major transition in budget philosophy. The Government-sponsored defense programs began to shift emphasis away from cost control and to focus attention, instead, on the necessity of getting a job done. Production programs and delivery schedules became the key factors in business planning. Operating costs became a matter for historical review, not of day to day control. Individual company budgets followed the general transition and some took on the character of master operating plans set up primarily to insure the manpower and material needed to meet production schedules. As material shortages increased, more and more companies were forced into establishing some kind of an overall plan in order to meet production quotas. Surprisingly enough, it was this period of stress and strain which sparked the emergence of the production planning and scheduling activity as a major adjunct to budgetary control.

However, as the war went through its successive phases, the long pipelines to the front began to fill up and, with this lessening of demand, interest again became focused on production costs. The Government, itself, as the major cus-

tomer, began to indicate a growing interest in competitive bids. Ability to produce no longer stood as the prime requirement for obtaining a contact. Additional evidence of the changing times was the movement for installation of standard cost techniques in government-operated plants. With the salary and wage differentials which existed in different areas of the country, the Government had been hard put to find some common unit of measurement for comparing the jobs being done by competing facilities. A standard cost system proved to be the common denominator which leveled out the individual and territorial variations. From the experience gathered in such plants, many of the larger manufacturing companies moved to incorporate standard cost programs into their privately-operated activities. It became at once evident that a good standard cost system could be of immediate and material aid to a budgetary control program.

Despite the increased emphasis on cost control from these influences, it was not until the end of the Korean incident that most companies began to knuckle down to a realistic appraisal of budget techniques. The cost control phase of budgetary programming was dusted off for an all-out drive to reduce production costs. With the tapering off of post-war consumer demand, the necessity for reestablishing a firm competitive position became the number one objective for many concerns. Moreover, companies began to take cognizance of the substantial management potential inherent in a well organized budget program. Such a program could easily be expanded to become the master plan for coordinating all of a company's activities. With this start, a number of important by-products began to evolve from budget planning. The simple expedient of getting executives to sit down in advance and commit themselves to specific programs became a vital element of control. Many companies experienced the relief of seeing a number of expensive programs "tossed out" as a direct result of such pre-budget study and evaluation.

The Variable Budget Concept Emerges from Fixed Budgeting

And so it has gone, up to the present period. There has been more and more emphasis upon the extension and refinement of budget plans. One of the relatively recently-introduced budget theories which seems to offer considerable advantage in planning, is the variable concept. Variable budgets are distinguished from fixed or allotment type budgets in that the allowances for certain elements of expense are made to vary in direct relationship to some major element of the business (i.e., standard labor, net sales dollars, etc.). The theory behind the variable or flexible budget is that the average business is too dynamic, too vola-

tile to permit the plotting of a course on an evenly-divided monthly basis. Under a fixed budget plan, the total expenses are projected for a year in advance. Then, to establish a monthly control figure, it becomes necessary to divide the annual budget allotment by twelve.

The budget allowances resulting from such a plan do have the advantage of being uniform and consistent. Each month's budget provision is exactly the same as the month before. Unfortunately, this continuity is out of conformity, even with the short-term business cycle, for the average commercial operation. Almost every business concern has some kind of a peak period at which volume rises sharply and then falls off through the remainder of the year. It is the extent and duration of these peak periods that will dictate the type of budget plan to be used. Where the high and low periods are sharp and pronounced, the fixed budget just will not handle the situation. During periods of peak sales activity combined with accelerated productive output, the fixed budget generally falls far short of actual expenditures. The major budget overrun then can, of course, be explained as a volume variance and, in the off months when the budget allowance is comfortably over the reduced expense level, this volume variance philosophy can be used in reverse. However, top management is never quite able to reconcile the plus and minus gyrations of this kind of budgeting. Operating executives generally miss the real significance of the variations on both sides of the trend.

But this is not all. In many respects, the inability of management to evaluate the variances from a fixed budget is not as important as the effect that such a plan has upon the line organization—the managers who operate *under* these plans. These men are called upon once a year to project their requirements for the coming year. The requirements may cover everything from personnel to supplies, from repairs on equipment to the amount of utility expense anticipated. Many of such expense elements may be outside the immediate control of the department manager. Nevertheless, he is expected to come up with an expense projection for the coming year. What are his reactions? In the first place, he probably has not been given too complete a picture of what the coming year is going to hold. He may have been shown the aggregate projection but without sufficient detail to bring it all into focus. In the end, he has only two choices anyway. He will assume that the work objective which has been set up represents the optimum level for coming year and budget accordingly. More likely, he will "play it safe" and provide enough cushion in his figures to cover any and all eventualities. Whichever route he follows, it will be with little or no enthusiasm for the budget program.

The flexible budget concept, on the other hand, recognizes the dynamic qual-

ity inherent in a modern business operation. It acts much like an elastic band, stretching out during periods of peak demand and contracting again when the peak has passed. The theory behind the variable budget is that some expenses will rise in relationship to labor or sales, or some major business integral. In some instances, expenses may move in almost direct relationship to this prime factor. These expenses are known as fully variable charges. Other expense items may be affected only in part by variations in the production and sales volume. These have been classified as semivariable expenses. Finally, there are a few remaining expenses which vary only slightly or not at all with volume and, therefore, must be considered as fixed.

Perhaps, to the casual observer there doesn't seem to be anything of great significance in the variable concept of budget planning. If he notes anything, it will probably be the extra work involved in preparing and operating such a budget plan, for the setting up of a variable budget requires a great deal of preliminary investigation and analysis. The operating expense structure must be carefully studied to determine the separation of expense items into the three expense classifications. When this has been accomplished, it is then necessary to determine the extent of fixed expense in the semivariable expense categories. Each of these stages involves an exacting and detailed study. But, when it has all been resolved, the company emerges with a budget program acceptable to all levels of management.

Top executives endorse such a program because it furnishes a medium for the control of costs and the measurement of progress, a medium which does not have to be factored for every slight variation in business volume. The operating supervisors, in turn, embrace the variable concept because it makes sure that they will not be caught in a "squeeze play" if there is a shift in volume of business during the year. Of equal importance, foremen and operating heads are responsible only for controllable expenses, those over which they can exercise direct control. Depreciation, payroll taxes, and many of the other expenses are not even shown on their budget schedules. This enables each operating supervisor to focus attention where it will do the most good.

Budget as an Agent in Reconciling Viewpoints

Of all the changes registered to date, none is of more significance than the growth in stature that budgets have attained in the eyes of management. The budget activity has now developed its own area of operation, an area separate and distinct from all of the other segments of the company. This area of activity has, in many companies, become something of a neutral zone, a buffer state

separating the conflicting views of the sales, the manufacturing, and the financial departments. Often each of these groups is convinced that its own particular problems are the most pressing and feels that its specific contribution will most profoundly influence the company's operation. This interdepartmental conflict is sharply etched in the following except from remarks at a recent management conference.

> "The sales department wants immediate delivery of anything it may happen to sell. To ensure this, it wants an inventory of finished goods big enough to cover all unusual orders and a flexible shop which will work like mad to get out a rush job and then perhaps not have much to do. The manufacturing department wants a steady level of operation just comfortably below full capacity, without constantly having to hire and fire and scramble to meet emergencies. It agrees with the sales department that we should have a big inventory in the warehouse but thinks that the sales department should do a better job of selling, to ward off demands for unusually quick delivery. The treasurer wants a reserve of cash in the bank to meet any and all contingencies and hence wants a low inventory. He agrees with the sales department that the shop should be more alert and resourceful in meeting emergency delivery problems, and he agrees with the shop that a lot of these emergencies could be eliminated if the sales department would really get out and sell." ("Forecasting Sales of Industrial Products", Donald E. Gates of Dodge Manufacturing Corporation, Mishawaka, Indiana, before an American Management Association Workshop, 1952.)

Faced with these entrenched departmental philosophies, it is small wonder that executive management has turned so fervently to the more comprehensive budget concept. Its unbiased and objective analysis of facts and conditions is welcomed, indeed, by the harried executive. With all of today's pressures, key executives just do not have the time to make an introspective examination into each departmental projection but, at the same time, they do need some kind of weighting factor to enable them to set the proper value on such projections.

Shall the Budget Function Be Independent?

All of these factors combine to form one underlying reason for trying to establish the budget program as an unbiased and objective reporting medium. One of the first steps has been to try and divorce budget development from the line functions of the company. Traditionally, the budget has always been a part of the financial division—generally organized within the controller's department. This has always seemed a natural grouping, considering that the budget deals primarily with figures. By having access to all the pertinent data, such as standard costs, expense distribution, salary and wage schedules, etc., it has been felt that any duplication of clerical effort would be avoided.

On the other hand, some companies have come to feel that a rather substantial price is paid for these savings of clerical time. It is sometimes true

that accountants, particularly financial accountants, are better at financial planning than at programming the overall business schedule. It is unfair to expect them to quickly bridge the many years of conservative training. Their earnest desire to protect and preserve the company's assets is bound to influence many of their decisions on future planning. These companies are moving to completely disassociate the budget planning from other functions. The budget program is being set up as a staff function reporting directly to the office of the president or the executive vice-president of the company.

Companies which have already effected this change in organization alignment report the accomplishment of two major objectives. First, it has gone a long way toward making sure of a completely unbiased and objective approach to future business planning. Secondly, the budget activity becomes a kind of inner conscience, a constant reminder of executive management of its initial aims and objectives.

Thus budget planning has progressed down through the years. From a collection of miscellaneous figures the budget has grown and matured into a first class management tool. That there will be more and even broader developments in budgetary planning is today a certainty. With the growing trend toward automation and the increasing complexity of modern business, executive management will need even more information than in the past. It will turn in increasing numbers to the budget idea, with its inherent great potential for positive direction.

A Refresher on Flexible Budgeting for Departmental Cost Control

by EDWARD A. LAGERQUIST, JR.

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The elements of expense reduction and control through the application of flexible budget technique are reviewed in this article. Procedural steps preparatory to the adoption of this budgetary approach are described and the development of departmental allowances, is illustrated.

EXTREMES ARE ALMOST ALWAYS vulnerable. This is illustrated by the "fixed" and "variable" approaches to bugdeting. Both have serious disadvantages which tend to render real control ineffective. The fixed budget is attractive in its simplicity because it is based on a fixed allowance for an anticipated activity. However, this assumption is its weakness, for business seldom operates at anticipated levels. Thus, when activity varies from the assumed level, the control program fails because of its inability to adequately reflect the changed conditions. Conversely, if a variable approach to budget allowance is based on the assumption that all (or even most) expenses fluctuate with activity, an invalid assumption is also encountered, which does not give adequate consideration to the relatively fixed expense elements such as monthly salaried payroll, property taxes and certain insurance.

A third approach to the problem of expense control is the flexible budget technique. This control approach utilizes the advantages of the fixed and variable programs to the fullest, minimizes their disadvantages, and introduces some new control points. The flexible budget, when properly installed, provides allowances for the prevailing mixture of fixed and variable elements in the company's operations. This provision is vital to the effective operation of an expense control program. A prime advantage of the flexible technique is the fact that, once the budget is established, no major re-work is required to keep it operative, so long as major management policies are constant and the anticipated major operating conditions still prevail. It is, therefore, not necessarily limited to a specific operating period. Normal revisions and refinements are the only requirements for keeping the budget up to date.

Preparatory Steps

There are a number of important steps which must be taken preparatory to the development of a flexible budget. The first is the preparation of an explana-

tory chart of accounts. It is not important that definitions of the various accounts follow either standard accounting text definitions or even the practices of other companies. Rather the requirement is a consistency of recording, which delineates the expenses in the same manner as they will be controlled.

The second step is the determination of the base upon which budget allowances will be predicated. A unit base is preferable to a dollar base, inasmuch as this constitutes a foundation of measurement not subject to fluctuations caused by monetary variations. Standard direct labor hours are an example of the unit-type base. A standard unit base is particularly effective because it eliminates other fluctuations from the measuring stick, i.e., those due to inefficiencies in operations and, thereby, results in budget allowances constructed specifically for control purposes. It means, as it should, that the efficient supervisor will be closer to budget than the inefficient by the fact that he is closer to allowed standards.

The third step is composed of three interlocking parts which must be worked out at the same time in order to assure the proper orientation of the budget. One is the determination of the organizaitonal level or area to be controlled. The second is the determination of expenses considered to be controllable or non-controllable by supervisors. The third is the identification of these expenses as (generally) fixed, semi-variable or variable. Probably the best organizational point of control is the department level or an equivalent level under the supervision of a junior executive classification, such as foreman. The drilling department, illustrated in accompanying exhibits, is a typical example of an organizational control point. Supervisors at this level are the closest to the operating conditions and, therefore, are in the best position to exercise effective control. Generally, the determination of controllable and non-controllable expense elements, will be relatively the same regardless of the organizational control points. For instance, at the supervisory level of foreman, there is little or no control over the depreciation expense allocated by the accounting group. However, to assure effective expense control, this should be considered in the light of the organizational control point in order to highlight any possible exceptions.

At this stage of the development program, expenses must be identified as *generally* variable, semi-variable, or fixed. These classifications of expense items can frequently be determined through use of the scatter chart technique. Assuming the chart has expense dollars on the perpendicular axis, actual expense amounts are plotted against the comparable base units. A trend line is then drawn which will indicate the character of the expense. A relatively horizontal trend line indicates a fixed expense, one which reaches zero on both axes indicates a variable expense, and one which intersects substantially above zero on

the perpendicular axis indicates a semivariable expense. A type of expense which is identified as fixed under one supervisor may be variable under another, due to some difference in the size or operation of the function, or some other physical factor. The secret of the effectiveness of the flexible budgeting technique boils down to controlling the expense according to the manner in which it arises.

The final preparatory step in the control program is the orientation of the supervisory personnel. During this orientation, the anticipated accomplishments of the program should be explained. Elements of the program, such as the definition of expenses and the classifications of the control techniques, should be described in detail. Finally, the orientation should cover the importance of the supervisor's role to the success of the program.

Illustration No. 1: Departmental Indirect Labor Budget

In order that we may have a basis to exemplify development of the control program, let us assume that the anticipated sales activity and the related direct plant activity have been forecast, and that a desired rate of return before taxes has been established. Normally, these factors would be developed as a part of the general financial control program, prior to the development of the expense budgets.

One of the best starting points for the expense control program is examination of labor costs. Control of these costs usually means control of other expense items closely related to labor. Personnel on the payroll give rise to two types of expenses, labor expense and other operating expenses, such as fringe payroll costs, supplies, utilities, etc. Thus, if the number of people is properly controlled, the expenses incurred as a result of these people will generally be controlled. The Departmental Operating Budget for Factory Expense-Salaries and Wages (Exhibit 1) is an example of a form designed for the establishment and control of indirect labor expense.

Under the caption "budget at varying levels," there should be about seven sections similar to those indicated. The middle section would be the average-month direct activity as forecast for the period, with the columns to the left in descending progression and the columns to the right in ascending progression. This mid-point will become the pivot for all of the expense budget computations.

At this stage, the factors of fixed, variable and semi-variable expense come into play for the first time. Labor categories directly related to productivity, such as indirect shop labor, are of a variable nature and can be expressed as to

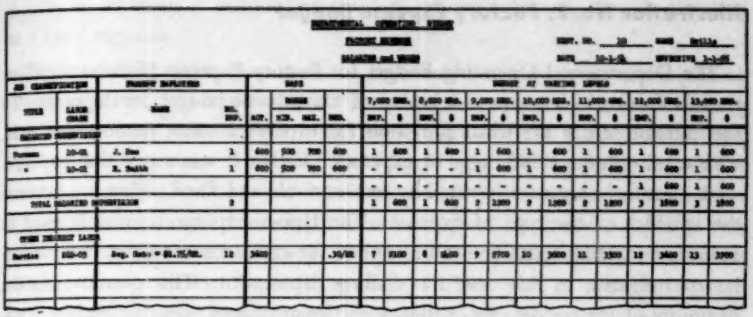

EXHIBIT 1

much cost per direct hour. On the other hand, salaried supervision is normally not directly variable with productivity and, therefore, becomes a fixed or semi-variable cost. Such a cost is termed fixed when there is no change in head count throughout the various levels of the budget. It is termed semivariable when there are "stepped" changes, such as one foreman for the first two levels, two foremen for the next three levels and three foremen for the last two levels. Once the head count has been set, the expense allowance is simply a matter of computation within the salary and wage rate structure.

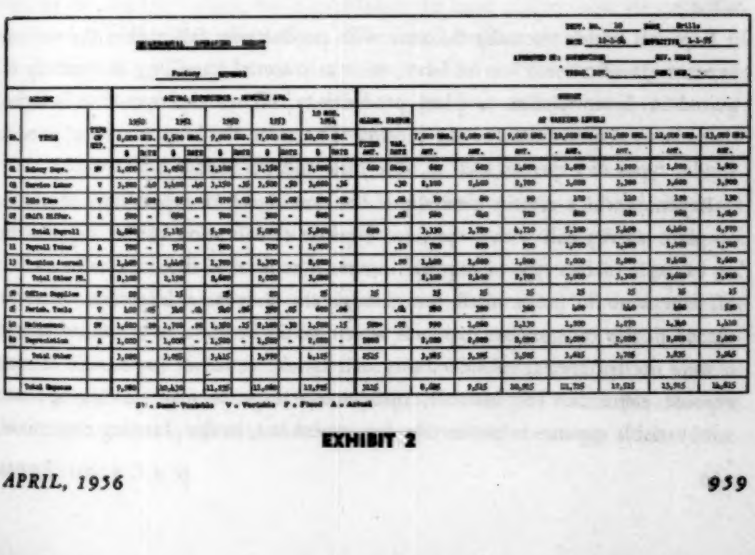

EXHIBIT 2

Illustration No. 2: Factory Expense Budget

The Departmental Operating Budget for Factory Expense (Exhibit 2) illustrates a form which serves as a record of the expense budget development. To the extreme left is the usual provision for expense account number and title, with a sub-column titled "type of expense." Earlier it was stated that expenses were classified as generally variable, semi-variable and fixed. Now we get into the specifics of the type of expense. The type-of-expense column is used to indicate budgeting technique to be applied for each account within the particular control area, in this case, the drilling department. This characterizes the flexibility of the budget, for, within a particular control area, the budget is applied in the same manner in which the funds are actually spent, regardless of how the expense may have been classified for the company as a whole.

To illustrate this concept of expense control, let us consider classification of the expense accounts appearing in Exhibit 2 and then go on to the mechanics of the form. Two semivariable types of expense are indicated, namely, supervision salary and maintenance. Supervision salary is a step-type semivariable expense, because a specific number of supervisors can handle a range of activity before requiring additional assistance. The fixed element is representative of the range requirements and does not necessarily represent the lowest (or shut-down) level of fixed expense. Maintenance is a different type of semivariable expense. It is a well-recognized principle that certain maintence activity must be carried on regardless of plant productivity. Here we have a fixed element representing a possible shut-down expense, plus a variable factor related to plant activity.

Expenses which normally fluctuate with productivity fall within the variable expense classification. Service labor, such as material handling, is normally required in direct relation to plant productivity. When the operation is down, there is no requirement for the service. The same thinking can be applied to similar types of expense, such as, idle time and perishable tools.

Expenses which remain generally at the same level of expenditure regardless of plant activity fall within the fixed expense classification. Office supplies are an example of this type of expense inasmuch as it takes about the same amount of paperwork to get a small run through the shop as a large run. Also included in this category are expenses which would be variable or semivariable if it were not for special considerations such as relative minor importance of some expense elements. For instance, maintenance expense may be classified as a semi-variable expense in productive department but, in the planning department,

it may be so small it cannot be related to productivity and, thus, is classified as a fixed expense.

Expenses over which the supervisor concerned has little or no control are allowed at actual. Shift differentials for example, are related to plant activity but, because they are normally a part of a union contract, are not controllable by the line supervisor. The same reasoning is generally applicable to vacation accruals. Another sort of expense not controllable by a supervisor is exemplified by payroll taxes, a governmental imposition beyond his control, although they are intrinsically of a semi-variable nature because of the maximum limitations relative to wage bases. Depreciation may be either fixed or variable, depending upon the write-off method used. However, this expense, too, is not a supervisory responsibility and it is only logical to allow it at actual.

The first set of money columns on this Exhibit 2 are of material assistance in determining these variable, semi-variable and fixed relationships. They provide information as to past experience, serving as comparisons against the anticipated improvements to be budgeted. Past experience, plus a knowledge of normal expenditures, plus the previously mentioned rate of profit return to be achieved, are used in combination to develop both how to control and how much to allow. At this point, the experience and judgment of the budget supervisor comes into play. He must apply this experience and judgment to the problems at hand, solving each to the best of his ability.

The right-hand half of Exhibit 2 records the budget at the varying levels of activity in the same manner as was illustrated in Exhibit 1, with the addition of the column entitled "allowance factors." This column is vital to the operation of the flexible budget, for it establishes the fixed and variable factors which are used in computing the budget. The fixed amount represents the level of fixed expenses within the range of activity and does not necessarily represent so-called shut-down expense. The variable rate per hour is determined at the mid-point level of activity. Expenses classified as semi-variable will require use of both columns, for both a fixed amount and a variable rate per hour.

The budget at the varying levels is simply the application of the allowance factors to the respective operating levels. Computation of fixed elements and variable elements will be self-explanatory. However, semivariable elements and elements allowed at actual may require some clarification. The semivariable elements are the sum of the fixed portion plus the result of the variable computation. The actual elements are applied at estimated fixed amount or variable rates, purely for the purpose of developing a total budget within the allowable limits for overhead expense, and for use in financial forecasting.

DEPARTMENTAL EXPENSE REPORT

DEPT. 10 - Drills PERIOD March 1955

ACCOUNT			MONTH						YEAR TO DATE			
NO.	TITLE	TYPE OF EXP.	ACTUAL		BUDGET		* OVER UNDER		ACTUAL		* OVER UNDER	
01	Salary Supervision	SV	1	200	1	200			3	600		
03	Service Labor	V	3	700	3	300	*	400	10	500	*	700
05	Idle Time	V		100		110		10		350		20
07	Shift Differ.	A		850		850			2	200		
	Total Payroll		5	850	5	460	*	390	16	650	*	680
11	Payroll Taxes	A	1	000	1	000			3	200		
13	Vacation Accruals	A	2	200	2	200			6	600		
	Total Other Payroll		3	200	3	200			9	800		
20	Office Supplies	F		20		15	*	5		75	*	30
25	Perishable Tools	V		400		440		40	1	000		200
40	Maintenance	SV		950	1	270		320	3	950	*	100
80	Depreciation	A	2	000	2	000			6	000		
	Total Other Expense		3	370	3	725		355	11	025		70
	Total Dept. Expense		12	420	12	385	*	35	37	475	*	610

EXHIBIT 3

Illustration No. 3: Expense Report

No expense control program is complete without some means of comparing the objectives of the program with results achieved. Corrective action cannot be taken, nor can effective control be maintained if the responsible persons are not aware of the differences between goals and attainments. A departmental expense report similar to Exhibit 3 is a most effective method of presenting this information. Note how current month conditions and year-to-date trends are available at a glance.

Make Haste Slowly But Plan on Complete Installation

The expense control program outlined in this paper will provide management with adequate controls at all levels, with a minimum of revisions. Complete

re-work of the budget is not necessary at the beginning of a new financial period. It gives the operating supervisor a control framework related to any current activity, rather than an allowance based on anticipation or advance estimate. One final word of caution seems in order. The successful institution of a program such as this cannot be rushed. A mimimum of six months should be allowed. If a company has existed for an appreciable length of time with no controls, another six months to a year in the same condition may be preferable to a hurried attempt at improvement. Even so, marked cost improvement may develop earlier than expected simply because of the planning and preparation which will be going on in connection with the budget installation. But the installation must be envisioned as a complete one. Installation of half a program often is worse than no program at all. If you plan it carefully, give it time to "jell" and administer it fully, you will find your company reaping the manifold benefits which are the result of a good expense control program.

Target Areas for Lowering Costs

by WILLIAM CECIL JONES

Controller, Alabama By-Products Corporation, Birmingham, Alabama

The possibilities for cost reduction and control are everywhere, but neither results from uttering glittering generalities. The author here provides specific instances of profit making possibilities open to the industrial accountant, discerning particular areas within the usual broad categories of labor, material, and (less extensively) equipment.

DURING THIS PERIOD of keen business competition the good cost accountant —like everyone else on the management team—must be a profit maker for his employer. To accomplish this, the accountant must know intimately every operation of his company and must firmly believe that every operation in the business, every purchase of labor, equipment, material or service is a possible avenue of cost reduction, and the reports he receives and uses or receives and passes on must reflect this focus. He may discharge this responsibility through several media—periodic cost analysis throughout the month (daily, weekly, and monthly), and analysis of the monthly cost results, both favorable and unfavorable.

However, daily controls and short-period analyses are usually not sufficient to obtain the goal of minimum operating cost in all phases of the company's activities. Special studies and special control tools are necessary on a long-term basis, relating many factors which might not otherwise be considered relevant, among many others, labor and associated employment costs, source and quantity of material purchased, purchase and sales discounts, admixture and volume of products manufactured, and the abandonment of old and acquisition of new facilities. It is the purpose of this paper to illustrate the usefulness of special analyses and control devices and to provoke constructive thinking by briefly outlining some of the principal factors to be considered in carrying it out.

In the Labor Area: Machine Crews, Premium Pay, Efficiency

One of the most important tools available to effect adequate control over labor cost is the use of authorized crew quotas, i.e., the number of employees, detailed by occupation and rate, required to operate a particular facility or perform a specific function at varying levels of activity. All subsequent analyses of direct and indirect labor cost are made by using the approved crew quota as

a base. This approach is considered practicable, regardless of whether or not a standard cost system is used. A daily quota control report is made by or under the supervision of the cost accountant. The report reflects the over or under-authorized quota use of labor, detailed by occupation and department. The prompt presentation of such control data enables management to take corrective action immediately in the event of over quota use of direct or indirect labor. If practical, an even tighter control can be exercised. Calculation of the number of hours of labor, by occupation, which can be scheduled in the succeeding week on the basis of authorized crew quotas at the expected level of operations may be required and also approval of authorized management prior to posting over-quota employees' time on the payroll.

Most labor contracts now require the payment of time and one-half or double time for overtime work. Also, the Fair Labor Standards Act and the Walsh-Healy Act both provide for premium pay. The importance of controlling overtime cost cannot be over-emphasized, inasmuch as overtime worked has a dual impact on costs. It is the most inefficient time worked because the employees are already fatigued by having worked a normal shift (or week) and yet must be paid for at a minimum of 50 per cent premium. Also, many dangers are inherent in the problem of overtime. Employees become accustomed to the high premium and they are reluctant to give it up when conditions make it necessary to eliminate overtime. In many cases the overtime problem has been made a bargaining issue difficult to setttle on a satisfactory basis.

Our management has found that a daily report of overtime incurrence by causes is effective in controlling this cost, because it provides the basis for immediate corrective action. This is in the form of an Authorization for Overtime. (Exhibit 1). Where possible, it is highly desirable that this report be made prior to the incurrence of the overtime. Savings in overtime pay cannot be realized after the expense is incurred. In addition to the daily report it was found that some kind of standard for the amount of overtime to be incurred is necessary to provide a usable means of control. The type of cost system used has no bearing on the use of such a standard for control purposes. Rather, this standard is a "bogey" established from past experience, representing the minimum anticipated incurrence of overtime. Through the use of such standards the areas and cause of excessive overtime is readily identified.

There is still another cause of premium pay. Present-day labor agreements, in most cases, require the payment of shift differential for the evening and night turns. This renders it desirable that operations be confined, as far as possible, to the day turn which, moreover, is generally better supervised

AUTHORIZATION FOR OVERTIME

Mining Department 3-11 Turn July 16

Badge No.	Name	Occupation	Overtime Hours To Be Worked	Premium Hours	Rate Per Hour	Overtime Premium Cost
314	John Roe	Electrician	8	4	2.50	10.00
475	R. E. Smith	Elect. Helper	8	4	1.80	7.20
Total			16	8	XX	17.20

Reason for Overtime: Emergency Repairs to No. 5 Ventilating Fan

APPROVED: S. I. Bagwell, Superintendent — G. A. Lewis, Foreman

EXHIBIT 1

and more efficient. To this end, the cost accountant periodically analyzes all functions being performed on the evening and night turns, in order to ascertain whether the work being performed on those turns can be transferred to the day turn.

Quite apart from premium pay, the importance of efficient utilization of the labor force cannot be over-emphasized, because two of the major elements of cost, labor and equipment, are directly increased if this goal is not attained. Therefore, it follows that an analysis of the efficiency of each crew must be made periodically by the cost accountant for management's use. The regular monthly analysis of cost results often pinpoints the specific need for such analyses. In the absence of a standard cost system, each crew is measured against the standard allowance for the product mix experienced during the period analyzed. This analysis is developed to the point at which management is adequately informed of the weak and strong points of each crew within the organization, that is, the comparative efficiency of the crews in setting-up equipment to begin production, incurrence of each type delay experienced in operating the facilities and the rate at which good product is produced during the time equipment is actually operating. Good and poor performance are each given attention.

In the Materials Areas: Suppliers, Shipment, Receipt, Usage

Very often materials used by a business can be purchased from several different sources. When this condition exists, it is the responsibility of the cost accountant, working with representatives of the purchasing department,

to determine the most economical source of supply. It is evident that the initial cost of the material is not the sole determining factor when deciding what is the lowest cost source, for very often, quality will more than offset the effect of a higher purchase price. Therefore, a cost study in this field may represent a long-period analysis of the results obtained from use of material by the various suppliers, in order to determine which source is actually the most economical.

Another factor which must be considered is the cost of purchasing material from outside parties as compared with the out-of-pocket cost of producing it. An example of economy achieved by attention to this point may be cited from an analysis of the use of a certain heavy machine part within our company. It was found that this particular part was ordered machined by the manufacturer at higher cost and freight rates than would have been incurred had the part been shipped unfinished. Investigation revealed that this machining operation could have been performed in our shops at a considerable cost decrease and a substantial savings in freight rates.

In purchasing material, it must be realized that the cost of transporting the material from the seller, which varies with the method used, constitutes an important part of the purchase price. Receipts of all major materials must be analyzed in order to determine the most economical transportation methods to be followed for each. For example, should the material be transported by boat, truck or rail? (In discussing this point, it is well to point out that a careful analysis of the methods followed in handling and moving material between locations within the plant also often reveals fertile areas for cost reduction.) In addition to the actual charges paid the carrier, any additional costs which normally result from using any one method of transportation must be considered. This includes factors such as partly filled cars, additional handling within the plant, and demurrage charges. Of these, demurrage cost sometimes gets out of line and it then becomes the responsibility of the cost accountant to furnish management the data necessary to again place it under control. This is easily accomplished by rendering a daily report to management exhibiting each railroad car within the plant, showing location, date received, number of days in the plant, total accumulated demurrage cost, if any, and reasons for car not being released within the contractual free time.

It is very important that material be ordered and received in the proper size and chemistry. As an example, tool steel must be ordered in the chemistry, size and length which represents the lowest cost after taking into consideration the purchase price in the light of the cost and useful life of tool parts made within the plant. An elementary rule in the approval of invoices for payment is

that procedures be established to assure receipt of material in conformity with order quantity and specification prior to actual payment of the invoice. However, even though material is received in exactly the right quantity, size and chemistry, the condition in which it is received may prove uneconomical. For example, lumber may be rceived in random lengths, widths and thickness requiring many man hours for unloading and stacking. A recent study of lumber received at our main storehouse revealed that some of this lumber could be obtained in packaged lots at no price increase. Receiving material on pallets rather than loose, such as brick, lubricants and lumber, permitted one man with a fork lift tractor to unload a car in a few hours.

The controlling factor in determining the right time of receipt for material is the specific time it is required. In many cases the most economical operation can be maintained only by scheduling receipt of certain materials on specific days of the week or month in preference to other days. It is possible that, in some instances, material should even be scheduled for delivery at specific times during the day. To the extent such scheduling is possible, demurrage can be avoided, crews made available to receive material without overtime and constant inventory levels more easily maintained. For example, due to limited facilities for sulphuric acid at one of our plants it is essential that tank cars of this material be received on dates specified in the order. If this is not done, delays will be experienced in our operations, causing interrupted schedules, decreased production and increased cost.

If the objective of minimum handling cost is to be attained, it is essential that material be delivered at the desired location. The desired location is determined by its proximity to the consumer or storage area and by the availability of facilities for handling the material. Duplicate handling of material within the plant must always be avoided if the goal of minimum handling cost is to be realized. Extensive use of labor and facilities to rehandle material within the plant are indications that handling cost can be reduced.

The cost accountant, working in collaboration with the purchasing department, may bring about a reduction in the cost of materials by analyzing purchases to determine the extent advantage is or is not, being taken of quantity discounts or lower unit prices resulting from large quantity purchases. In making this analysis, the advantage of reduced purchasing cost is compared with the disadvantages of large quantity purchases, to determine the economic desirability of adopting such a policy. Some of the disadvantages of large purchases are: (1) increased storage space requirements, (2) possibility of losses due to theft, obsolescence or deterioration, (3) increased capital

invested in inventories and, (4) increased taxes and insurance. An analysis of the purchase of a certain type of chart with our company is a good example of what can be accomplished through such a cost study. In this case, the quantity discount ranged from 10 per cent for purchases in lots of 12 to 29, up to a maximum of 60 per cent when purchased in lots of 2,400 and over. It was decided that future purchases of these charts would be in quantities of 2,400 per order, annual requirements being approximately 2,950 charts.

All efforts to reduce cost through more economical purchasing, storing and handling are largely in vain if the material, after receipt within the plant, is wasted. Our cost accountant provides management with the tools necessary to minimize losses. In fulfilling this obligation, perpetual inventory records are established and maintained especially on material particularly susceptible to theft and deterioration. If at all practical, all material is accounted for through the use of perpetual inventory records. As a part of the perpetual inventory procedures, a physical inventory is taken of each commodity at the time a purchase order is placed. The balance on the perpetual inventory record is adjusted, if necessary, to equal the quantity on hand. A review of the physical inventory adjustments and the turnover of each item, as recorded on the perpetual inventory record, pinpoints wastage through theft, obsolescence or deterioration.

In the Operating Equipment Area

Any decision to acquire additional facilities or to abandon present equipment must give recognition to the effect that this action would have on net profit. It is the responsibility of the cost accountant to analyze proposals for facility changes and to provide management with information relative to profit effects. To do this, he, in collaboration with operating, engineering, sales and other interested personnel, analyzes the proposal to determine in advance the per cent return on investment and the period of time required to recover it. Some of the major factors appropriately considered by the cost accountant in the determination of the expected profit effects of proposed facility changes are as follows:

1. Activity level—The acquisition of the new facility may result in a greater capacity for products already in production. If the market is sufficiently great and the competitive position of the company is such that its expected participation in the market will permit utilization of this capacity increase, additional revenue from sales can be expected. This would also be true in instances in which the new facility would permit the production of new products if such additions are not offset by decreases in present product lines. In all instances, if sales mix or volume are expected to change, the expected effects should be reflected

in a comparison of normal profits on the affected products under present conditions and under the conditions proposed.

2. Operating costs effects — In some instances, equipment must be replaced due to its worn out condition or due to obsolescence. The operating and maintenance cost of present facilities should be compared with costs expected with the proposed facilities. Modernization, as reflected in continued technological improvements in design, speed, and quality of work, often provide benefits in production rate, yield and labor requirements. Accessories, lubricants, supplies, utilities, services required and maintenance costs will also frequently be affected by facility changes. Ownership costs, as reflected in depreciation and property taxes, will also be affected. All such factors must be considered in the development of cost comparisons. It is important that the cost accountant, in his determination of these cost elements, consider only costs that will in fact, be affected. For example, attention must be directed to distributed costs such as utilities and services to ascertain the net change in those costs on an incurred rather than charging rate basis.

3. Fixed cost absorption—In instances in which the volume and/or mix of sales may be affected, it is essential that the effect of the unit volume change on fixed costs be determined, not only on the product directly involved but also on products which would be affected by the change in fixed cost unit rates in anterior facilities. Although dollar costs will possibly be unaffected in incurring cost centers, the reallocation of these costs over a larger volume of units will lower the fixed cost inclusions in products which might appear unaffected. The change in fixed cost inclusions in the total cost of such products will be directly reflected as a change in gross profit on sales, if sales prices are not correspondingly changed.

The cost accountant's responsibility does not end with the submission of a profit analysis of the proposal. It is his responsibility to prepare follow-up reports after the facility change has been completed, acquainting management with the progress being realized. The follow-up reports must be presented in sufficient detail to disclose the area of deficiency.

Sundry Areas: Waste Disposal, Packaging

Sales of primary products are the main source of income in all companies. However, waste materials produced in the mining or manufacturing of primary products are part of the business and, very often, through proper disposition, can add to the profits of the company. Although it is the responsibility of the research engineers and sales representatives to investigate the possible use or outlets for the waste product, the cost accountant evaluates the various proposals and recommends the most economical plan to management for its consideration and final decision.

Packaging and bundling of certain types of finished goods for shipment must be properly performed in order to protect the material in transit. However, there usually are several different methods which can be followed and, in many instances, excessive precautions—resulting in higher costs—are taken in the preparation of materials for shipment.

Alternative methods of packaging and bundling must be evaluated by the cost accountant to determine the most economical method for each product.

Often, customers will revise their shipping specifications to conform with more economical packaging methods, resulting in savings to both the buyer and the seller. In the event that changed customer requirements result in higher packaging cost, the cost accountant may present a report to management exhibiting the estimated amount of the cost increase. This report must be accurate and complete so that management can decide whether to absorb the increased cost or to pass it on to the customer.

New Areas Are Developing

It is now recognized as central to the work of the cost accountant to aid management in achieving its objective of maximum production of quality products at minimum operating cost. The scope and importance of this responsibility continues to increase. For example, the inclusion of elements of a guaranteed annual wage in recent labor agreements creates many new cost problems in employment and scheduling. The degree to which the cost accountant discharges his responsibility determines to a large extent the growth and development of his company. Each problem must be approached with the knowledge that no existing arrangement is perfect and, based on an accurate appraisal of the entire operation involved, specific recommendations must be made for management's consideration.

Application of the principles underlying this paper have resulted in very substantial cost reductions in our company during recent years. Experience has proven to our satisfaction that a cost accountant is a profit maker—but only when he effectively discharges his duty.

Cost Studies for Cost Reductions

by F. RAY FRIEDLEY

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The industrial accountant's role in a cost reduction program is a key one. This article provides examples of techniques applied in the solution of high cost problems. Although the examples are illustrative of the steel industry, the validity of these methods in all types operations will be immediately apparent.

TO AID MANAGEMENT in accomplishing cost control and reduction in a planned and systematic way, a comprehensive analysis program of historical costs and statistics is necessary. Equally or even more important is management's need for short-range pre-planning of costs and operations, in order to keep them in line with rapidly fluctuating conditions. It is the responsibility of the industrial accountant to furnish this information to management. His ingenuity and imagination in providing information that is important and useful and which tells the story behind the figures in a clear and concise manner determine his success.

Telling about the industrial accountant's role in a cost reduction program pursues a subject which has been much discussed but, even so, cannot be over emphasized. To give the benefit of our experience, I want to present some of the highlights of cost information furnished to management that has proved extremely useful. A brief description of our facilities and operations may be helpful in appraising the practical uses to which our program may be applied. Our plant is a completely integrated steel manufacturing operation with auxiliary facilities that include a power plant, machine shops, and in-plant rail transportation system. Principal products consist of sheared plates, structural shapes, hot rolled sheets in coils and in sheared lengths, merchants pig iron, and coal chemicals. Approximately 5,000 people are employed at capacity operations.

Since 1950, a standard cost system has been used for all of our operations. Under this system, areas of responsibility for cost performance are established for each major segment of operations and a standard product cost is provided for each semi-finished and finished product. Standards are engineered and are based on efficient utilization of manpower, materials and facilities, normal volume of operations, and product mix. The standards are intended to be "tight but attainable." The standard cost system provides an accurate basis

Summary of

BUDGETS - COSTS - VARIANCES

Illustrative Only

MILL DEPARTMENT D — DATE _____

ITEM	MONTH TO DATE			TOTAL MONTH		
	BUDGET	ACTUAL	VARIANCE	BUDGET	ACTUAL	VARIANCE
OPERATING PERFORMANCES:						
MATERIAL	13 952 560	13 969 [illegible]	(16 880)	19 661 000	19 684 000	(23 000)
LABOR	339 000	322 500	16 500	677 700	654 400	23 300
LABOR PREMIUM		1 400	(1 400)		2 600	(2 600)
REPAIR & MAINTENANCE	331 980	328 580	3 400	467 200	462 200	5 000
FUELS	117 100	120 100	(3 000)	165 800	170 000	(4 200)
UTILITIES	74 000	72 100	1 900	104 000	101 900	2 100
TOOLS & SUPPLIES	261 600	244 700	16 900	367 900	346 600	21 300
TRANSPORTATION & SERVICES	235 900	231 800	4 100	332 500	325 700	6 800
TOTAL OPERATING PERF. VARIANCE	15 312 000	15 290 100	21 900	21 577 900	21 547 200	30 700
OTHER						
VOLUME			700			1 200
STANDARDS REVISION						
NORMALIZING			(4 000)			(5 000)
PRICE			900			1 000
RECLASSIFICATION			(4 000)			(7 000)
ADJUSTMENT OF INVENTORY						
TOTAL COST VARIANCES			15 500			20 900

EXPLANATION AND COMMENTS:

Material	- Sub-standard yield on Finished Plates ($10 700.) Result of excessive rejections, mostly due to rolling. - Sub-standard yield on cut sheets ($14 190.) Due to poor quality of coils. Yields of other products are favorable.
Labor	- Fewer man hours with increased rate of production.
Repair & Maintenance	- No major jobs scheduled for June.
Tools & Supplies	- Variance applies to work rolls, receipts of which continue to be less than budgeted.
Reclassification Variance	- Off grade Sheets continue to be down graded.

EXHIBIT 1

for developing reliable forecasts of costs. The cost figures, statistics, and analyses of results compiled through its use also clearly indicate whether or not current performance is efficient, i. e., guesswork is eliminated.

The remainder of this article is devoted, first to a discussion of periodical reports developed, and then to a group of illustrations of information furnished by the accounting department in our application of standard costs and the successful results attained by management through use of this information.

Forecasts and Progress Reports for The Current Month

Executives responsible for plant operations are vitally concerned with day-to-day performance. Reports to this level of management must place emphasis on current month's forecasts based on planned production, to aid them in controlling costs and to measure the relative performance of their subordinates. The reports must be designed to provide fingertip control of key items and to direct attention to those items which require immediate action.

In order to furnish this type of information, a series of departmental and plant-wide statements is issued each week for the first three weeks of the

month, showing Budgets—Costs—Variances (Exhibit 1) by major expense classification, for the month-to-date at actual and estimated total for the month.

Basic data for the monthly budget are contained in the standards. Budgets are developed through application of these data to production forecasts. Actual costs are accumulated from information that is readily available under our accounting system. The forecasts are developed in our decentralized accounting units located in each major operating department. The accountants work closely with members of the operating department in accumulating operating data upon which the forecasts are based and the superintendent of each department underwrites the estimated costs for which he is responsible.

A significant factor to consider in a program of this kind is the use of good judgment in setting up procedures to accumulate the mass of details that make up the figures reflected on the statements, so that the week-to-week accumulation does not become a burdensome task. In our program, special emphasis is given to attaining accuracy in the important elements of costs that fluctuate widely with varying levels of operations. The use of mechanized procedures in accumulating the costs of two major items, namely repairs and maintenance and tools and supplies, and the use of average rates of pay in determining labor costs simplifies our work to a great extent.

The department superintendent knows the forecasted production schedule for the month and, in the steel business, there is little deviation from the schedule except for emergency purposes. Consequently, he wants to know in advance the amount budgeted for his department, the amount being spent as the month progresses, the items of expense that are out of line, and a brief explanation of the reason therefore, so that costs can be controlled and kept within or lower than the budgeted amounts. Exhibit 1 illustrates the report issued to the superintendent of a mill department showing this information. The same type of report is issued to each department superintendent, furnishing information for his respective operations.

The general superintendent is responsible for the entire operations of our plant. Estimated monthly production schedules for all facilities are furnished to him at the begninning of each month covering a three-month period. Like the department superintendent, he wants to know in advance what the cost picture will be under the projected rate of operations, in particular, whether it is expected to be good or poor, so that plans may be made to improve costs if the forecast shows them to be poor. He does not want to be by taken surprise with the costs that appear on the statements issued after the month has ended.

The summary of total plant variances furnished to the general superintendent

OPERATING PERFORMANCE VARIANCE SUMMARY

Illustrative Only

DATE _____

UNIT	TOTAL	MATERIAL	LABOR	REPAIR & MAINT.	FUELS	UTILITIES	TOOLS AND SUPPLIES	SERVICES
DEPARTMENT A								
MONTH TO DATE ACTUAL	11 000	4 100	(1 700)	4 000	9 900	1 100	4 800	(11 200)
TOTAL MONTH FORECAST	18 400	6 100	(2 300)	5 300	14 500	2 100	6 500	(13 800)
DEPARTMENT B								
MONTH TO DATE ACTUAL	(1 500)	1 000	400	4 300	(2 700)	(3 000)	700	(2 300)
TOTAL MONTH FORECAST	(2 100)	1 300	700	5 900	(3 600)	(4 700)	900	(2 600)
DEPARTMENT C								
MONTH TO DATE ACTUAL	(21 400)	(11 700)	4 100	2 700	(3 000)	(2 900)	(4 500)	(6 100)
TOTAL MONTH FORECAST	(32 200)	(18 700)	6 400	3 300	(4 400)	(3 600)	(6 600)	(8 600)
DEPARTMENT D								
MONTH TO DATE ACTUAL	21 900	(16 500)	15 100	3 400	(3 000)	1 900	16 900	4 100
TOTAL MONTH FORECAST	30 700	22 000	20 900	5 000	(4 200)	2 900	21 300	6 800
DEPARTMENT E								
MONTH TO DATE ACTUAL	6 900		(1 400)	6 600	800		(200)	1 100
TOTAL MONTH FORECAST	9 400		(1 800)	9 200	1 100		(300)	1 200
DEPARTMENT F								
MONTH TO DATE ACTUAL	2 000		3 100	1 000	(5 100)	100	(700)	3 600
TOTAL MONTH FORECAST	3 400		4 700	2 400	(7 700)	300	(900)	4 600
DEPARTMENT G								
MONTH TO DATE ACTUAL	7 100		1 500	100	200	400	3 100	1 800
TOTAL MONTH FORECAST	9 500		2 600	300	100	500	3 500	2 500
DEPARTMENT H								
MONTH TO DATE ACTUAL	6 100		10 700	(6 600)	(1 400)	100	(500)	3 800
TOTAL MONTH FORECAST	9 000		15 700	(9 200)	(2 400)	300	(700)	5 300
TOTAL PLANT								
MONTH TO DATE ACTUAL	32 100	(23 100)	31 800	15 500	(4 300)	(2 300)	19 600	(5 100)
TOTAL MONTH FORECAST	46 100	(33 300)	46 900	22 200	(6 600)	(2 200)	23 700	(4 600)

EXHIBIT 2

is illustrated on Exhibit 2. In support of this information, a copy of each of the budgets—costs—variances report, as compiled for the various departments is also furnished. A meeting with the department superintendents is held by the general superintendent immediately following receipt of the weekly information. Each superintendent comes prepared to explain the cost variances for which he is responsible and his plans for cost improvement. Through this review and discussion, the general superintendent readily determines what action should be taken on his part if it appears that the cost picture could be made better than planned by his subordinates.

After two such meetings, or by about the middle of the month, it is known with a great deal of accuracy what the cost results will be for the month. Issuance of revised forecasts at this time, and review by the general superintendent with his staff is primarily for the purpose of confirming the accuracy of the previous forecasts and to give effect to any last minute change in operations that may be planned. The final forecasts are frequently within one per cent, plus or minus, of the incurred costs for the month.

The executives of our division are highly interested in cost control and reduction, and require short-range forecasts in order to keep abreast of overall

COST VARIANCES

Illustrative Only

FINAL FORECAST — MONTH OF _____

	PRELIMINARY FORECAST MARCH	FINAL FORECAST MARCH	ACTUAL FEBRUARY	NET CHANGE FROM FEBRUARY
OPERATING PERFORMANCE	52 300	46 100 A	47 700	(1 600)
RECLASSIFICATION	(1 900)	(5 100)B	1 200	(6 300)
ADJUSTMENT OF INVENTORIES	(500)	(500)	(2 600)	2 100
VOLUME	12 000	12 800	8 000	4 800
STANDARDS REVISION	(2 500)	(2 700)	(2 000)	(700)
NORMALIZING	4 000	3 900	4 500	(600)
PRICE	(13 000)	(11 400)C	(11 900)	500
ALL OTHER	6 000	6 000 D	1 600	4 400
TOTAL	56 400	49 100	46 500	2 600

SIGNIFICANT FINAL FORECAST VARIANCES			VARIANCE AMOUNT
A. Operating Performance			46 100
(1) Material		(33 300)	
(a) Department A			
Above standard yield of furnace coke	12 400		
Off standard mixture due to high use of low volatile coal	(4 900)		
(b) Department B			
Sub-Standard ingot yield	(18 700)		
(c) Department C			
Below standard finished plate yield	(10 700)		
Below standard sheet yield	(14 100)		
(2) Labor		46 900	

(CONTINUED ON PAGE 3)

EXHIBIT 3

cost and profit results which may be expected from current rate of operations. The forecasts we furnish division executives are compiled twice a month—on the tenth and twenty-second. They reflect plant totals only and consist of the following reports:

1. Estimate of production and shipments of principal products.
2. Forecast of cost variances with explanation and comparison with actual variances for previous month.
3. Estimate of works gross profit on sales.

Exhibit 3 shows the final forecast of cost variances for the month. This report includes the preliminary as well as the final forecast of variances for the current month, actual for the previous month, and the net change. A brief explanation of major forecast variances is given in the lower section of the report and indicates the division responsibility where major fluctuations occur. It should be noted that the figures are summarized by variance classification only, rather than expense classification.

Through issuance of the above reports our division executives know well in advance of the month-end what the cost and profit picture is going to

be for our operations, how it compares with the prior month, and whether or not performance is efficient. The forecasts included in the reports furnished to division executives do not require additional work in their compilation since the basic data are taken from the estimates furnished to plant executives.

Turning Up Underlying Causes Through Situation Analysis

As there is always room for improvement, analyses must be made continually of all important cost items, whether they are good or poor, and in areas where costs are consistently higher or lower than the standards the cause must be isolated through an examination of the facts covering a representative period of time. By furnishing management this information, the cost reduction program can be made more effective and data are accumulated for consideration in revision of standards. In order to briefly illustrate how special analyses of historical costs aid management in accomplishing cost reduction, five typical case histories are presented in the remainder of this article.

Case 1: Overtime Versus Absenteeism

During times of maximum production, an extensive amount of overtime work usually occurs in industrial enterprises and this was the case in our operations. At normal operations, overtime should be incurred only as an offset to absenteeism, except in instances of emergencies which require overtime work, such as repair and maintenance of facilities to keep them in production. If overtime is more than required for these purposes, it usually is not justified. When the rate of our operations dropped, we found that the amount of overtime hours worked continued to exceed the amount of absenteeism hours.

This matter was called to management's attention in numerous cost meetings which are regularly held to review the monthly results of operations. Little was accomplished by merely pointing out the overtime situation. Therefore, an extensive study was made of the reasons for the overtime work. Without going into all of the details, the study included review of production and shipping schedules to determine whether customer requirements could be met through improved scheduling which would eliminate overtime work. We found they could be. The scheduling of maintenance work was also thoroughly reviewed to determine whether the pre-planning of jobs could be improved upon, so as to eliminate overtime schedules. We found it could be. Armed with this information, specific recommendations were made to reduce overtime through utilization of manpower and facilities in designated areas.

These recommendations were furnished to management, an intensive program

to reduce overtime work was instigated, and overtime was reduced to about the level of absenteeism. The monetary savings, based on the amount of overtime premium payments, was substantial.

Case 2: Reduction of Repairs and Maintenance Costs

Because of the tremendous investment in heavy production facilities and equipment, repair and maintenance are a significant item of expense in the operation of a steel plant. Analyses of repair and maintenance costs revealed that they consistently exceeded the budgets. We did not attempt an extensive study to determine and isolate the reasons for this condition as it would have been an endless task and action to reduce costs was needed quickly. However, the situation was pointed out to management through numerous graphic illustrations and it was recommended that all maintenance and repair work be carefully planned to eliminate the excessive use of manpower and materials that had crept into our operations during the peak production period. It was also pointed out that, if repair and maintenance costs were kept within or lower than budgeted amounts, a substantial cost reduction would result. Operating management was successful in bringing this important item of expense nearer the budget.

Case 3: Usage Study of a Major Open Hearth Raw Material

Various types of raw materials are used in open hearth furnaces for the production of all grades of steel ingots and are added to the heat of steel at various stages of its progress. Their uses vary with the chemical specifications of the steel produced.

Review of variances of open hearth materials disclosed that substantial unfavorable variances were occurring each month. An extensive study was made to determine the reasons for this situation. Numerous heat sheets, on which materials charged into each heat of steel produced are recorded, were reviewed and comparison made between the amounts of materials used and the established standards, taking into consideration the chemical specifications. The analysis disclosed that use of a particular item varied widely between heats of steel of identical specifications. Because of the large volume of steel produced, use of even a few excess pounds of this material per ton of ingots runs into a considerable sum of money.

The study disclosed that inaccuracy in measuring and carelessness in the use of this material resulted in the wide fluctuations which caused the unfavorable variances. The findings were reported to management and action

MATERIAL PRACTICE STUDY

OPEN HEARTH - DIVISION

Illustrative Only

ACTUAL CONSUMPTION - BASE PERIOD

PRODUCT	USAGE - POUNDS PER NET TON OF STEEL PROD.		VARIANCE AMOUNT (UNFAVORABLE)
	STANDARD	ACTUAL	
REGULAR CARBON	15.0	16.6	(19 000)*
500 TON REGULAR	47.4	46.7	200
LOW ALLOY	23.6	23.5	100
FOUNDRY STEEL	11.9	13.0	-

*Variance indicates that investigation be confined to production of regular carbon steel.

ANALYSIS - POUNDS PER NET TON OF STEEL PRODUCED

PRODUCT	STANDARD	ACTUAL - BY O.H. FURNACE						AVERAGE ALL FURNACES
		1	2	3	4	5	6	
REGULAR CARBON - SEMI-KILLED	12.2	19.7	15.8	15.1	16.6	15.8	14.0	16.8
REGULAR CARBON - PIPE PLATE	33.8	33.0	34.0	34.1	33.2	-	31.8	33.1
REGULAR CARBON - MECHANICALLY CAPPED	14.4	14.3	15.5	15.5	15.9	15.2	15.4	15.3

Heats aimed at low ranges are significantly out of line. Furnaces No. 2 and 4 are major offenders.

OPERATING PRACTICE CHANGES

All operating personnel were given a 24 hour training class on quality control. Weighing practices were revised and new scales installed. Supervision increased. Study recommended to determine if standards can be reduced on high range specification steel.

CURRENT RESULTS - POUNDS PER NET TON OF STEEL PRODUCED

PRODUCT	STANDARD	ACTUAL - BY O.H. FURNACE						AVERAGE ALL FURNACES
		1	2	3	4	5	6	
REGULAR CARBON - SEMI-KILLED	12.2	13.1	13.9	14.0	13.0	13.8	12.5	13.4
REGULAR CARBON - PIPE PLATE	33.6	33.1	33.9	33.3	33.4	31.1	31.4	32.9
REGULAR CARBON - MECHANICALLY CAPPED	14.4	14.2	15.1	14.9	14.2	14.7	15.4	14.6

EXHIBIT 4

was taken to bring the use of all materials within the established standards. The basic factors considered in this study and results obtained are illustrated on Exhibit 4.

Case 4: Use of Purchased Scrap Versus Start-Up of Blast Furnace

The demand for our products improved substantially during the early part of 1955, requiring full production from our steelmaking facilities. During the middle of February, it became apparent that one of our blast furnaces would have to be taken out of production for relining which takes approximately sixty days. Hot metal produced in the blast furnaces is used in the open hearth furnaces, along with scrap, to produce steel ingots. Consequently, because the furnace would be down for only a short period of time, management was faced with the problem of deciding whether to purchase scrap to offset the loss in hot metal production or whether to temporarily start-up a blast furnace located a few miles away, which has been idled because of previously reduced operations. The difference in cost of producing steel ingots and effect on open hearth production would be a significant factor.

The accounting department went to work to secure an answer to the cost effect of the two alternatives, which was urgently needed by management. It was necessary to take into consideration the blast furnace start-up and shut-down costs which would have to be applied to a short period of production, cost of transporting hot metal from the nearby blast furnace, effect on open hearth production if a higher-than-standard steel scrap charge were used, and the possible effect on scrap prices if substantial additional quantities were purchased. The study revealed that lower ingot costs would be obtained through start-up of the idle blast furnace.

Case 5: Relocation of Roll Grinder

Cost reduction often requires modernization and improvement of existing facilities, investment in new facilities, or both. However, before decision is made to invest money either way, management must be provided with reasonably accurate information showing the financial results to be expected. An example of facilities improvement involving a considerable expenditure at our operations was the relocation of a roll grinder from the roll shop to the roll storage building.

Analysis of expenses incurred in conditioning rolls for the plate and hot strip mill revealed that the costs were high because of the location of the roll grinders. The roll conditioning equipment of the plate and hot strip mill consists of four grinders and a number of lathes. Three of the grinders were located in the roll shop and one was in the roll storage building. Due to insufficient storage space in the roll shop, many of the rolls reconditioned there had to be stored in the roll storage building. Inasmuch as the roll storage building is adjacent to the plate and hot strip mill, transferring rolls from the hot strip mill to the roll shop for conditioning, then back to the roll storage building for storage, resulted in excessive handling.

The accounting department analysis brought about a study by the engineering department to determine whether or not one of the roll grinders could be relocated, in order to reduce the number of man-hours required in roll conditioning. As a result of this study, it was proposed to move one grinder from the roll shop to the roll storage building where rolls are stored. This would make additional space available in the roll shop for rolls to be reconditioned on the lathes and grinders located there and would reduce the distance necessary to convey rolls to the relocated grinder, thus resulting in substantial savings.

The Program Has Paid Dividends

The foregoing pages have illustrated only a portion of the information we furnish to management as an aid to its program to control and reduce costs. Proof of the monetary benefit of the program shows up in the operating costs. During the year 1953, substantial unfavorable variances were incurred, whereas for the majority of 1954, the unfavorable variances were much less than the previous year, in the latter part of 1954, the variances were converted to the favorable side—this trend continued for the most part of 1955. Interpreted cost-wise, this means that the program of cost reduction is effective.

Accounting Information Must Have Vitality

It is the industrial accountant's responsibility to provide information which will aid management in controlling and reducing costs. Although the information will vary considerably among companies, depending upon the size of the enterprise, nature and complexity of the business and the desires of individual executives, the following points should be kept in mind:

1. Reports must be tailored to fit the needs of various executive levels. The president of any large industrial company usually does not want many of the details that are valuable to a plant executive.
2. Reports must be issued promptly and include only that information which is important and useful.
3. Forecasts rather than historical results should be emphasized,
4. Short-range forecasts must be accurate since they are heavily relied upon in day-to-day operations. Otherwise, the information could be misleading and of little value. To attain accuracy requires full cooperation and coordination between the operating and accounting departments.

Placing special emphasis on short-range forecasts and analytical activities does not necessarily mean that more overall accounting manpower will be required but, even if it did, the results should more than justify the extra costs. It has been our experience that system studies and mechanization of routine clerical work have enabled us to shift personnel to intensified forecasting and analytical activities without increasing accounting department costs.

Responsibility for the control and reduction of costs is, of course, in the province of management executives. However, the success or failure of a cost reduction program will depend largely upon the ability and imagination of the industrial accountant in furnishing information and upon teamwork with the operating department.

Accounting Aids for the Factory Supervisor

by JOHN HIHN, JR.

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The factory supervisor represents the connecting link between top and middle management and the workers. The information which will be helpful to this level of management has certain individual characteristics. This article reviews the steps taken by the accounting department in one organization to make such help effective and to cement a working relationship between supervisors and cost control media.

THE USE OF ACCOUNTING INFORMATION by supervisors and foremen who stand at the final level of delegation of management authority in the factory and whose use of the authority so delegated is to direct the work of non-management personnel, is the concern of this article. The work of management at this level—direct as distinguished from indirect management—includes a minimum of the planning element and is primarily the exercise of control over the performance of specific operations or groups of operations involving men, machines and materials. It is in the area of controlling factory operations that industrial accounting comes into the operating picture most fully prepared to help. The development of standard costs, flexible budgets and fixed variable cost analysis have provided leverage on these problems.

However, the average foreman is, perhaps, less ready than management personnel at other levels to take full advantage of accounting information available to him. Hence, the problem of getting this information used by supervisors and foremen is one of communications also. It is a real problem. In fact, accounting to assist the supervisor is one phase of industrial accounting which needs attention. For the most part we have ourselves to blame for this. Unless we know operating objectives and problems, we cannot expect the foreman or any other supervisor to accept our work, for it will necessarily be poorly adapted to his needs. This article is confined chiefly to our company's methods of compiling data for reporting. In dealing with these methods we will explore some, but naturally not all, of the factors of control.

As previously noted, the responsibility of the factory supervisor includes a a minimum of the planning element. This is particularly true in a mass production industry in which large quantities of identical products are manufactured in accordance with customer's releases which are subject to change on short notice. Nevertheless, his responsibilities are not light. He, primarily, is responsible for seeing that the required quantities of high quality products are pro-

duced in accordance with the planning division's pre-determined schedule through the most effective utilization of the men, machines and materials within his department. This also means that he must make sure that he receives fullest cooperation from service and maintenance departments to assure uninterrupted production without unduly increasing the overhead cost of operating the department. It is up to the cost department to serve him in his efforts to discharge his functions.

Focus on Excess Labor Costs—Daily

Workers in production departments are paid on an incentive basis. Standard piece rates developed by rate setters for each operation covered by a manufacturing procedure represent standard costs. For purposes of recording and reporting excess labor costs, the cost department has assigned a labor code to each variation from the standard wage payment established for each operation. These variation codes are applied to payroll cards by timekeepers and represent the following:

1. Special and one-day rates covering operations necessary to manufacture a part but which have not been established by the manufacturing procedure. These may result from using substitute material or from the correction of defects due to equipment failures. Incentive rates may also be set for these special operations for a specified quantity of parts or they may extend for the life of the job.
2. Make-up time which adjusts low incentive earnings to a guaranteed minimum level.
3. Pre-production rates which are paid at the beginning of a job, before standard rates are established.
4. Authorized wage adjustments which are granted to employees who are temporarily transferred to lower-rated jobs for company convenience.
5. Overtime premium.

All such excess costs are accumulated by the tabulating department until a production run is completed. The timekeepers then report the quantity produced. The tabulating department furnishes a tabulation showing the quantity produced on each run and the total excess costs by type of excess. Excess costs are related to the quantity produced to develop a unit excess cost. Unit standard costs are added to unit excess costs to obtain a total unit shop cost. The cost of spoilage is also calculated, based on a report of the quantities scrapped. To determine the total product cost, all benefits either paid to or accrued for the benefit of the employee, are added to the shop cost. These costs are considered as direct labor and include shift bonus, holiday pay, cost of living adjustments, annual improvement factor, city wage tax (portion paid by the company), pension, and supplemental unemployment benefits.

A report issued by the second day following the completion of the run, is prepared to advise each plant management of the cost of each press run made

in each of its shops. In addition to the detailed cost of the present run, columns have been provided in the report to show for comparative purposes, the total cost of the previous run and the best run. There are several manufacturing units in each of the plant locations. A weekly report of press labor costs is prepared for each manufacturing unit, at the product level. The purpose of this report is to show each unit superintendent that portion of the product manufactured in his unit in relation to the other units and to the total product cost. At this point, the product cost within manufacturing units is brought together to form a complete product cost.

In assembly departments, cost centers have been established for the accumulation of excess labor costs for each product line. For the computation of daily assembly productive labor costs, the principle is established that all excess costs expended during a particular day must be absorbed by that day's production of end products. Excess costs are accumulated daily by type of excess, as in the press shop, and related to the quantities produced. A daily report is prepared and forwarded to the unit managers, covering excess assembly labor costs by product lines.

In addition to the daily cost reports covering completed press runs and assembly production, a tabulation is prepared daily by plants of all excess cost expended the previous day. The daily press tabulation shows the type of excess by part and run numbers. The daily assembly tabulation shows the type of excess by cost centers and assembly numbers. This tabulation is forwarded to the unit superintendent before three o'clock of the afternoon of the following day.

Prompt Disclosure of the Causes of Downtime

Besides making good use of his labor force, the factory supervisor must maintain a continuous flow of work through the machine lines in his department, in order to meet his production schedules. However, machine failures and other interruptions beyond his immediate control occur intermittently for a variety of reasons. Although each interruption takes his time the supervisor is not in a position to realize the cumulative effect of these delays unless records are kept. They may not be his fault but they are a factor in his situation. To assist the supervisor in exercising better control over machine operations, the accounting department has developed a means for analyzing and summarizing these data on reports.

Timekeepers in press departments must ascertain from line foremen, the actual running time and the downtime hours for each shift and must record this on a

card provided for each press. Codes have been established by the accounting division to fix responsibility for instances of downtime among service and maintenance departments. The responsibility may rest with purchasing and stores departments for lack of materials, with the employment department for lack of manpower, with the planning unit for improper machine loading, or with the mechanical divisions for delays in repairing tools or equipment. Downtime cards are processed through electric accounting machines, and tabulated reports are prepared weekly to show for each group of similar type presses the distribution of total downtime hours for each reason, as well as the percentage of downtime hours to total capacity hours. In addition to helping the supervisor these reports serve as a guide to top management in making decisions regarding manpower and equipment required to eliminate serious interruptions to production.

Reporting the Facts on Spoilage

At the factory supervisors' level, the control of spoilage is very essential in view of the material replacement problem, as well as from the standpoint of cost control. If raw material is rejected on the floor because of surface defects or performance failures, the shop supervisor must contact the quality control division of the purchasing department to arrange for the replacement of the material and for the processing of claims against suppliers. The shop supervisor must also exercise control over spoilage by eliminating the causes. To do this, he must be well informed as to the variety of reasons involved and the extent of spoilage attributable to each reason. Here again, the accounting division lends a helping hand.

Inspectors prepare scrap tickets in multiple-part sets which include a tabulating card. The original requires approval by the manufatcuring unit superintendent, who determines whether or not economical repairing or re-working is feasible. One copy of the approved ticket accompanies the material to serve as sole authorization to the salvage department for disposal, and the tabulating card is forwarded to the accounting division. Scrap tickets must contain the part number and quantity in addition to the who, what, when, where, and why of the cause. Of the latter, the "why" is so important that approximately thirty reason codes have been assigned to cover it, to assure corrective action by manufacturing and material handling supervisors. The tabulating cards are used for the preparation of weekly reports, which are distributed to each manufacturing department. These reports show part numbers, part names, and quantities scrapped, as well as the cost by reason and department. For scrapped assemblies,

the costs of all component parts included therein are accumulated by use of master explosion files. The effective use of these reports at the factory supervisor's level has resulted in a substantial reduction in material spoilage.

Identifying Control Areas in Overhead

Overhead involves many more ramifications than productive labor and material costs. Furthermore, overhead costs are controlled at various levels, due to their varied nature. The front line of control over expense materials and supplies is exercised by department supervisors who originate requisitions covering withdrawals from stores. Small tools are withdrawn from tool booths by factory employees who must sign a tool check for each item. Largely because of this variety the control exercised by supervisors over the indirect labor and supplies required for the efficient operation of their departments must be tied-in to master controls which are necessary to insure the successful operation of the company. In view of this, it might be well to discuss some of the factors involved in establishing and maintaining a successful overhead control system.

In the development of an instrument for control of overhead, it is an absolute necessity, in order to insure success, that the budget department's principles, methods and procedures, report design and enforcement all be planned with simplicity in mind. This simplicity must extend to the term, "overhead". Here it means all costs other than direct labor and direct materials. In other words, unless a cost in question represents labor expended in the manufacture of the product or material which becomes a physical part of the product, it represents overhead. This makes it unnecessary to talk about shop burden, selling, administrative, and general expenses and many other terms which more frequently than not will be misunderstood by or be confusing to secondary management. Always remember that it is a prerequisite of a successful system of overhead control that the secondary management group, from the assistant foreman right on up through the superintendent level, understands, participates and willingly cooperates in the budget operations. They represent the grass roots of the control system.

The next step in the design of an overhead control budget is placing the responsibility for overhead expenses through a well designed, authorized and properly publicized organization chart and the design of a system of mechanics for the budget. In order to do this, we must develop standards and procedures which will produce reports that will be understood and workable by supervisors and yet designed to be based upon and tie into the accounting system. This requires breaking overhead down into its major *primary* components. One might

be overhead labor and its related costs, which would include wages and salaries, payroll taxes, employees insurance plus any other so-called fringe benefits. Another component might be overhead materials, which would include maintenance materials, factory materials, and office supplies. Another component, which we consider unaccountable at the plant level, would most certainly be fixed charges, which include rents, depreciation, taxes and insurance (other than those connected with payrolls), debt expense, etc. The fourth and final component is made up of a variety of items depending upon the type of industry, such as power and light, legal fees, donations, advertising, telephone, etc. In presenting overhead in this manner for control purposes (and at least temporarily forgetting overhead expense distribution to cost centers, which are very necessary to the accountant for cost purposes), we find that we have not "lost sight of the woods for the trees." We have simple groupings understood by management personnel.

How Specific Indirect Labor and Material Items are Controlled

The first two components, indirect labor and materials represent the major part of overhead and constitute the two main items which are directly controllable departmentally through the secondary management organization. Control of these two classes of expense lies at the point of origination of the overhead charge (rather than the point of distribution). The responsibility for the maintenance of plant and facilities is in the hands of the maintenance superintendent, i. e., budget responsibility is functional at point of origination.

Our working medium for indirect labor cost control has been simplified by the use of manpower utilization standards, i.e., units of a normal work week paid at straight time, in addition to dollar controls. The superintendent understands what charges are made against his budget, for example that he is being allowed no overtime and is not being penalized for an absentee experience. He actively participates in its development by periodically requesting, through a standard form, the number of personnel by job classification required to operate his department under the scheduled manufacturing activity. These requests may be accepted or adjusted in line with standards created by studies applicable to each individual function. Illustration of the type of studies referred to are (1) development of a ratio of maintenance costs to the value of plants, machinery and equipment under various levels of production activity, (2) relationship of sanitation costs to an established unit of floor space, or (3) ratio of the hours expended on inspection, material handling, etc., to direct labor hours.

In controlling indirect material costs, as with indirect labor, we endeavored

to find a working medium, in addition to dollar cost, which would give our management organization an understood and workable tool. Our answer to this problem was the use of descriptive elements. Even though our business is large and complex, we were able to limit the number of basic elements to less than a hundred and included were such items as lumber, hardware, electrical supplies, plumbing supplies, janitor's supplies, stationery, shipping pads and cartons, small tools, etc. We have developed standards based upon consumption per direct labor hour in the productive departments, standards based upon the projected general production activity in the plant for the production service groups, and task budgets based on experience statistics in other departments. Material studies are being made continually with the idea of reducing these costs through substitutions, improved maintenance procedures, etc.

To supplement the budget and further assist the supervisors in manufacturing units, special cost reports are furnished at various intervals for review by the supervisors at the weekly plant manager's staff meeting. One of these covers services charged directly to the overhead of manufacturing units by other departments, such as trucking (production material handling), sanitation, stores (raw material handling), inspection and maintenance. These charges are analyzed and related to machine running hours and per cent of direct labor in each unit. They are also set up on a comparison basis showing the respective service charged to each of our manufacturing units, to provide a competitive basis for control. Other reports are provided for particular problems, such as tool expense. In this case, a report is made quarterly showing the die and jig expense for each customer served by the department, related to machine running hours. This is made on a comparison basis for the different units. In assembling departments, supervisors are required to identify requisitions covering welding and polishing materials, with the products on which they are used. From these requisitions, special reports are prepared to compare each week's usage with predetermined standards per hundred units of production, as developed by the indirect material control department.

Just a Start at Helping the Supervisor

All reports discussed in the article are based upon the principle of management by exception. Labor cost reports reflecting the utilization of manpower indicate to the factory supervisor the extent of repair work or other extraordinary operations required in his department, to which he should devote special attention. Further, they point out impediments to continuous production and may disclose reasons why employees' earnings fall below the guaranteed mini-

mum. They also call attention to the additional costs incurred when workers are transferred from high-rated jobs to cover up for absentees on lower-rated jobs. Downtime reports indicate to factory supervisors the extent of cooperation rendered by service and maintenance departments, as well as the care exercised by employees in using tools and equipment. They also point out the loss of productive capacity incurred through the use of machines which are constantly in need of repair. Scrap reports which analyze material spoilage by the various reasons place the factory supervisor in a position to take corrective action which will result in substantial savings to the company.

Budget reports expressed in dollars and cents are the usual yardsticks by which the overall efficiency of the departmental supervisors are measured. To assist supervisors in achieving better control over operating expenses, we have developed special reports which compare certain costs with machine hours, direct labor, and production counts. We have also prepared reports which compare the performance of each manufacturing unit with each of the other manufacturing units, in order to develop a competitive spirit among the unit superintendents.

Notwithstanding all of these special efforts, we realize that we have just managed to scratch the surface insofar as providing accounting assistance to the supervisor is concerned.

Plant Trouble-Shooting Activated by Accounting Data

by EDWARD W. HANLEY

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The personal side of accountant-foreman relations has seldom been examined in detail in current literature. The underlying stress in this article is placed on the personal contact between plant level accounting and departmental management to effect not only cost reductions which accounting results suggest but those, as well, which may come from the investigative activity of production personnel stimulated by accounting disclosure and concern, diplomatically but persistently expressed.

A FEW YEARS AGO when the high productivity of the post-war period began to taper off, our company found itself deeply concerned with the problems presented by the changing economy. As manufacturing cost began to assume an ever-increasing importance in the corporate picture, we attempted, through development of a two-point program, to adapt our factory accounting procedures to accomplish the greatest possible good without adding to the clerical expense. The two points were, in question form, what cost control procedures should be established as regular, normal operating routine, and what should be done when these normal controls fell short of their desired objective?

A Daily Appointment with Each Department

To answer the first question, a system was established under which each of the twenty-seven departments in the three plants covered by our budget are visited each day at approximately the same time of day by a representative of the factory accounting division. The scheduled reason for this visit is to hand the department head a report which itemizes the expenses of his department for the second day previous, compares the value of production paid for with the value of pieces received into inventory, acquaints him with the number of hours with which he has been charged by the tool room, machine repair, millwright and electrical departments, and lists the identity and cost of orders run without piece-work standards. However the delivery of this report, important as it is, is only one reason for the visit. In our thinking, there is a more important reason for handling its delivery in this

manner. By establishing contact with the department head at approximately the same time each day, we are attempting to make our operation (in cost accounting) an expected, accepted part of his own. Some of our foremen have been quick to utilize this contact as a period during which the physical aspects of their production problems can be discussed in the light of their probable consequence on cost. Some of these on-the-spot discussions have postponed decisions until the results of a special and detailed analysis could be made available as a basis for action. The discussions are always diplomatic. We are particularly careful that the accounting representative observes one basic rule: Never minimize the foreman's problem. Supply him with accurate figures and let him minimize the matter himself if it does prove to be a minor nature.

Our foremen have almost all been interested in cost. The measurement employed in ascertaining the productivity of a department is the standard labor cost value of the finished pieces transferred and the spoiled pieces scrapped. This means that the department overhead is charged for any variation between pieces paid for and pieces received, any deviation from standard manufacturing procedure, and any scrap which is not reported through the correct channels. As can be readily imagined, this method of evaluating direct labor makes the intelligent foreman extremely curious about the costs used on his production reports and the quantity of pieces reported as transferred or scrapped. This brings him into closer association with the cost and planning departments and makes for more accurate figures, because they have now become of prime importance to the large group of experienced people which the foremen comprise.

A Line Representative to Spear-Head Staff Work

Naturally, in a group of twenty seven different foremen we have found some of the old school who show no active interest in accounting information and are seemingly content to mentally restrict their responsibility as foremen to production of their schedules at any cost. This brings us to the second question—what to do when normal controls fail? Recently, we selected a group of four such men and arranged a meeting in which we proposed to sit down with them, try to draw them out on their problems, and determine if we could expand or change the reports being furnished them for the purpose of increasing their usefulness. After two hours of discussion, we had made little or no headway toward the resolution of the basic problem and it was apparent that they and we were talking two entirely different

languages. In an attempt to salvage something out of an otherwise completely wasted morning, we asked these formen if they would not at least question the accuracy of our calculations reporting their efficiencies low week after week and come up with a few facts to support their contention. This possibility seemed to engender a spark of response on their part but in the ensuing weeks, it was increasingly apparent that the spark had winked out.

In the light of this impasse, a few weeks ago the vice-president in charge of the plants took a hand in the situation and appointed one of his most able foremen as a representative of his office to go into these departments on the problems of cost and labor relations. This man's directive was to avoid action, himself, and to instruct the foremen how to move against their problems. We supplied the manager's representative with our appraisal of a specific department's troubles. Its operating allowance, budget efficiency, and labor volume for the past five years were itemized. The current work force was listed by name and number, average earnings rate and job, shift, and excess labor record. Supervision was identified by name, position, and shift, both hourly and salaried. The department's principal excesses were identified and evaluated from the year to date figures of the current budget, with comments added.

The remainder of this article will give principal attention to what the plant management representative, armed with information of this sort, did in his contacts with a particular department. First, however, we will give a more specific idea of what the department's troubles were, although it will be clear, from subsequent paragraphs, that not all of these troubles were solved, or even tackled, at once. Nevertheless, the informational weapons given by accounting staff were indispensable to success with any and all problems and were assembled, and communicated to the plant management representative with some care. They are, therefore, worthy of mention here, even though the solution of each problem will not be narrated. It will suffice to show how the plant management representative was enabled to go into trouble-shooting action armed and armored with facts, as well as his own experience.

The mapor problem was high percentage of rejections. The department head had indicated that a reasonable rate would be three per cent. Accordingly, the re-operation and scrap allowances had been set at the figure but had never been closely approached. Rejections seemed to come from various locations within the department as well as from the next department and final assembly. A second problem was repairs. High cost of repairs and maintenance of machinery and equipment represented weekly charge of from somewhere between seven and eight hundred hours from the machine repair department.

The need seemed to be for basic data. This would mean exploring the possibility of instituting some system under which the foreman and his supervisory staff would be aware of the cost of machinery maintenance as it was incurred. Checking production was a third problem. The department's supervision had brought out the existence of several inaccurate methods of checking pieces paid for in the department, probably the most serious of which was on an operation for which each operator habitually used more machine operations on each piece than called for in the standard practice instructions. Another problem was that a clerical assistant for the department had been proposed, to permit records development.

These were the department's difficulties, as we outlined them for the plant management representative. All of the points embodied in the outline were more or less "old stuff" to most of the people who had been close to the department's operation but we were attempting to furnish this individual with a beginning point. After going over the report with his superiors, he sat down with us in a number of more detailed discussions on various points, plotted a plan of action, and then went out into the department to see if the plan could be adapted to the facts. The first morning he had a long discussion with the foreman, at first on generalities but gradually worked it down until finally, he asked what in the foreman's opinion was the largest single contributor to his troubles. That started things. It will be noted that the initial trouble detailed and solved was not on the preliminary list but, before it was met, utilized both the production (experience) and informational (accounting) background with which the trouble-shooter entered upon his task.

Personal Attention to Personal Problems

Please bear in mind that this foreman was first and foremost a production man, one to whom schedule was the all important thing. Naturally his problem was a producing one. He pointed to a section of his department where some fifteen girls sat on both sides of a bench engaged in mechanically applying cotton tape to copper wire coils. It seemed that he was getting only a fraction of the production out of this location that his schedule called for and his main concern at the moment was how he could increase the output of these individuals. The plant manager's representative suggested that the foreman and he go up and down the line, talk with each operator, note the reasons they gave for low productivity and then go over the situation from the operators' viewpoints. This suggestion amazed the foreman because

apparently, he had formed a habit of relying on his methods man for mechanical assistance and his department's steward for labor contact.

However, the two of them did go up and down the line. They examined closely machines that the operators said were not performing efficiently. They listened patiently to requests for higher piece-work rate. One rather stout woman demonstrated how the position of the motor mounted underneath her bench kept her from getting close enough to her work. Another's eyes were not all that they once were. The advantage she would gain from a machine light was clear. In all, the pair of observers received almost fifteen different complaints from fifteen different operators.

Their first move toward correction was a talk with the department's steward. They pointed out that inexperience was a heavy contributor to the people's inefficiency and secured an agreement under which the company would pull the two most experienced operators out of the line and set them up as instructors to move about to show the others how the operation was best performed, pointing out mistakes, etc., and in general giving whatever technical assistance was required. The union was requested to agree to keep the operators on the particular jobs so that this education would not be wasted through constant shifting of personnel.

Next, attention was turned to the mechanical problem. The plant management representative had been accustomed to fast and intelligent maintenance service in his department. He found that this foreman was not. The maintenance man assigned to the department had several other departments as well. He attended to each of these department's needs as he was able to get to them. The foreman and representative went to call on methods supervision. They asked for and received a promising younger man to devote his entire time to the department. With him, they checked the operations about which operator complaints had been received. They designed new fixtures, made machine adjustments, gave the woman with the poor eyes a machine light, and moved the motor under the plump woman's bench. In short, they did something about each one of the complaints they had been given. (Except one—they did not increase the piece-work rate of pay.)

The educational program promptly began to show results. Operators doubled and tripled their output within the span of three weeks. They were not expert yet but most were approaching or past the point of minimum production requirement. Other sections of the department were looked into. The approach used was much the same—talk with the operator, get his side of the argument, determine whether or not his complaint was legitimate, and if it was, try to remove its cause, or if it was not point out the facts

to him and demand increased effort. (If it did not have the desired effect, the steward was contacted in order that the operator might be shifted to a job more in line with his ability.)

This is a large department, with over two hundred people employed on three shifts. The program still continues and almost every day we sit down for an hour or so with the plant management representative and the foreman, going over the department's figures for the day previous. Hardly a day goes by that the plan of attack is not modified a little to recognize a physical obstacle or to gain an added advantage which had not been foreseen. A marked reduction has been realized in the excess labor account. The repair condition is presently up to investigation. Machine repair supervision is called in as soon as the period of increased activity resulting from the drive to increase output is over.

Meantime, the plant manager's representative has moved into other departments on the same errand. The problems differ but the answers seldom do. The most important test which the recommended corrections must pass is that of permanance. The problems, once settled, must remain settled, for the representative never loses sight of the essential fact that his position in each department is a temporary one, that his main responsibility is to train a foreman how to act after he has left him to his own devices.

The True Scope of Accounting Information

I am hopeful that, in discussing the program used in this one department, I have not gone too deeply into detail. I can only offer as a reason that, to me, all of the considerations dealt with are factory accounting information. The stout lady's tummy and her neighbor's eyesight are accounting information in that they have a direct effect on the department's operating figures. To translate this avoirdupois and astigmatism into dollars, along with the hundreds of other disguises that excess cost hides behind, is the challenge flung in the teeth of the factory accountant. If he is to accomplish his objective, he must unmask and expose these costs for what they are. It has been our experience that, once the unmasking has taken place, the days of the excess are numbered.

Perhaps the largest single asset the factory accountant can have is the confidence and cooperation of the production manager who, in most organizational setups, is the direct supervisor of the department foremen. Most of the men occupying the production manager's positions in our organization are former foremen whose ability has outgrown the limits of a single department.

However, their memory has not. We have found it to be a productive practice to contact these men first when excesses develop in departments within their jurisdiction. Even if a production manager is unable to lend direct assistance toward solution of the problem, the fact of his awareness of it may well prove to be the best insurance possible that every effort will be expended by all concerned to expedite the solution.

P.S.: Issue Situation Reports for the Duration Only

A great variety of cost and production reports have been in existence at one time or another within our oganiaztion. Some, such as the variances between actual and standard costs, efficiency calculations, burden reports and related data, are incorporated within the factory's variable budget, which is distributed each week to each department. Others, such as operator and machine efficiency, analyses of sub-standard performance, high spoilage and idle time, and a host of others have been issued at regular intervals for certain departments when the need arose.

Some months ago, the excess labor figures for a couple of our departments indicated that we were paying for a "whale of a lot" of pieces on the lines, which were not coming out in the form of finished pieces. For a few weeks, we issued a daily and weekly report of operations paid for and finished pieces received, during the existence of which we were successful in correcting the time-keeping procedure and eliminating the excess. Then we eliminated the reports and allowed the excess labor figure on the weekly budget to again resume control.

This procedure is followed with all so-called special reports. We initiate them in as detailed a manner as the situation demands and continue them for as long as the necessity requires but, as soon as the condition is eliminated, so is the report. This has a doubly beneficial effect in that, while it provides an effective weapon during the emergency, it is strictly temporary and does not require added clerical help.

One Approach to Useful Product Profit Statements

by W. A. KERNS

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The ramifications of costing theory are not dealt with in this article. Rather, it portrays a form of statement—and several modifications of it—which stresses "contribution to overhead from delivered sales" and is regarded as serviceable, whether the objective is to show company results, product or product line profit, or the separate effect of volume and time costs.

ACCOUNTANTS MUST KEEP IN MIND that the most important objective of industrial accounting is to determine and improve the profitability of products, product lines, and plants. With this objective kept in mind and using simplified illustrations, we shall attempt here to show some of the practical possibilities which are offered by techniques which might be identified as marginal balance reporting, modified direct costing, the use of scattergraphs to determine costs assignable to volume units, and functional distribution of expense.

Marginal balance operating reports and products profitability determination go hand in hand. Everyone will agree that certain costs are readily assignable to products. Certain other costs are assignable only on an arbitrary basis. Unless a real basis for assignment of costs to products or plants exists or can be determined, no assignment should be made. Exhibit 1 is an example of a simple marginal balance report which illustrates treatment of non-assignable costs. The format shown is particularly adaptable to a single product operation selling to more than one class of customer at differing rates of discount or selling in several territories having differing delivery costs. It is true that the number and amount of nonassignable costs should be kept at a minimum. Every method possible should be used to find a real basis for distributing costs, without destroying the values of direct costing. One of the finest methods for determining the actual behavior of costs is a scattergraph which is illustrated in Exhibit 2. This device may be used to test, in a practical way, assignability of costs. The vertical axis represents dollar cost and the horizontal axis represents volume. When data covering various volumes is plotted on this scattergraph, a definite relationship may be obvious. When a definite relationship does exist, a real basis for assigning costs to products has been established

ILLUSTRATION OF MARGINAL BALANCE REPORT, STRESSING CONTRIBUTION TO OVERHEAD FROM DELIVERED SALES

Multiproduct Manufacturing Company Report of Operations

	TOTAL	PRODUCT A	PRODUCT B	PRODUCT C	UNALLOCATED
SALES					
Less Distribution Costs					
Sales Expense					
Advertising Expense					
Warehousing Expense					
Delivery Expense					
Total Distribution Cost					
CONTRIBUTION TO OPERATIONS					
MANUFACTURING COSTS					
Direct Labor					
Direct Material					
Manufacturing Expense					
Total Manufacturing Cost					
PRODUCT CONTRIBUTION TO OVERHEAD					
Other Income and Expense					
TOTAL CONTRIBUTION TO OVERHEAD					
Administrative Overhead					
PROFIT BEFORE TAXES					

EXHIBIT 1

and the costs should be assigned according to the formula determined from the scattergraph.

It will be seen that, in the illustrative data, each additional unit handled causes $.01 additional expense. The amount of $2,500 does not vary with volume and would be considered both nonassignable and nonvariable on a marginal-balance statement. In application of scattergraph technique, care must be taken not to combine nonhomogenous items, unless their behavior is similar. Certain costs, such as fuel, may vary by volume and also by seasons. Costs containing more than one variable can often be analyzed by using data for parts of several years, rather than using data for a continuous period. Other expenses can be analyzed by isolating certain chance factors, adjusting the raw data for these chance factors, and plotting on a scattergraph. Chance factors might include the number of working days or holidays in a period, daily temperature, floods, Saturday or Sunday work, etc. When the scattergraph technique is applied to cost data, the result may be expressed in terms of time and volume costs rather than fixed and variable costs. This concept may well eliminate much of the misunderstanding which develops between accountants and other members of the management group. Exhibit 3 illustrates this concept.

Some accountants insist on departmentizing (sometimes called compartmentizing) all costs. However, generally speaking, functional distribution of

SCATTERGRAPH (EXAMPLE: UTILITY COSTS) USED FOR DETERMINING BASIS FOR ALLOCATION OF COSTS TO VOLUME AND TIME

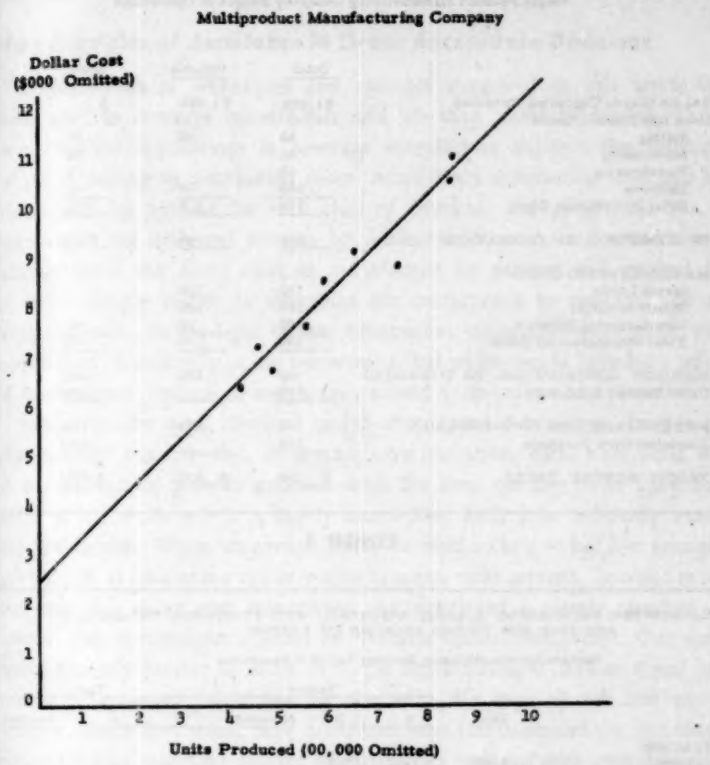

EXHIBIT 2

costs produces more reliable information than departmental distribution will produce. For instance, it is usually more accurate to determine the variability of total payrolls per unit than to determine the variability of departmental payrolls per unit. Changes in accounting distribution or shifting of work or employees from one department often cause departmental fluctuations which do not affect total costs. This applies especially to marginal balance statements in that they accommodate functional distribution easily. The variations and modifications are limitless. Time and volume allocations of expense can be arranged to accentuate the immediate problems and yet retain simplicity and

ILLUSTRATION OF MARGINAL BALANCE REPORTING WITH VOLUME AND TIME ALLOCATIONS

Single Product Manufacturing Company Report of Operations

	Total	Volume	Time
SALES (Gross Operating Revenue)	$1,000	$1,000	$
Less Distribution Costs			
Selling	80	50	30
Advertising	80		80
Warehousing	50		50
Delivery	100	60	40
Total Distribution Costs	310	110	200
CONTRIBUTION TO OPERATIONS	690	890	(200)
MANUFACTURING COSTS			
Direct Labor	100	100	
Direct Material	100	100	
Manufacturing Expense	100	20	80
Total Manufacturing Costs	300	220	(80)
PRODUCT CONTRIBUTION TO OVERHEAD	390	670	(280)
Other Income & Expense	(20)		(20)
NET CONTRIBUTION TO OVERHEAD	370	670	(300)
Administrative Overhead	200		(200)
PROFIT BEFORE TAXES	$ 170	$ 670	$(500)

EXHIBIT 3

ILLUSTRATION OF MARGINAL BALANCE REPORTING, WITH FUNCTIONAL DISTRIBUTION AND TIME AND VOLUME LOCATION OF EXPENSE

Multiproduct Manufacturing Company Report of Operations

		Volume			Time		
		Product		Not	Product		Not
	Total	A	B	Allocated	A	B	Allocated
REVENUE							
Sales	7,000	4,000	3,000				
(Discounts)	(600)		(600)				
Other Income	500	100	100	100			200
Total Revenue	6,900	4,100	2,500	100			200
EXPENSE							
Payrolls							
Travel							
Bldg. Depr. & Taxes							
Machine Depr.							
Material							
Total Expense	5,600	1,100	1,400	600	300	200	2,000
VOLUME MARGIN		3,000	1,100	(500)			
NET TIME EXPENSE					300	200	1,800
PRODUCT MARGIN & PROFIT	1,300	2,700	900	(2,300)			

EXHIBIT 4

completeness. Exhibit 4 is an illustration of a marginal balance statement with functional distribution of expenses and time and volume allocation of expenses.

Two Examples of Assistance in Order Acceptance Decisions

Combinations of techniques and concepts suggested in this article have been used in beverage manufacture and job shop metal fabricating. One of many specific applications in beverage manufacture required the application of direct costing to distribution costs. After direct distribution costs had been determined by product for each class of customer and geographic area, we determined net delivered revenue by product and customer. Inasmuch as we already knew the direct costs to manufacture by product and product line, it was a simple matter to determine the contribution to overhead for each suggested sale. In the light of this information, many sales were made which contributed considerably to the net revenue, but which would have been refused if conventional methods of assigning overhead to operations had prevailed.

Similar results were obtained in job shop metal fabricating. In this case, the company was new and, as in many new businesses, there were times when it was difficult to provide sufficient work for even the key direct labor force. Most of the work was in a highly competitive field. Jobs ordinarily went to the low bidder. When we needed work, we were willing to bid low enough to get the job, as long as our out of pocket expenses were covered. In order to meet the need for direct cost information, we developed a simple standard cost system with a minimum number of variance factors recognized. Our system was sufficiently flexible to allow us to use either standard costs or actual costs, whichever appeared practicable for the job. We kept all job cost records, whether standard or actual, on a direct cost basis and computed the contribution to overhead by job. Our concept of direct costs included only costs determined to be functions of volume. We arrived at total cost to manufacture and total contribution to overhead by accumulating the job records. Then we deducted variances from standard costs, as well as all plant costs determined to be functions of time, to produce "contribution to other overhead," which generally corresponded to the usual conception of gross profit. With the information we had at hand, it was not difficult to keep the estimators advised of the work load in the plant and the prices for direct labor and material which they should use in estimating. As a result, we kept the men working and were reasonably sure that every job would make some contribution to overhead. At the same time, we avoided filling the shop to capacity with low-gross-profit jobs.

Some Suggestions for Preparing a Chart and Manual of Accounts

by MILTON J. KEAN

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The chart and manual of accounts are basic accounting tools which have a significant effect on the information supplied for managerial decisions. The procedure to be followed in preparing a good chart of accounts is reviewed for consideration of those who have struggled along without these aids and for those who wish to keep their present chart as current as possible.

ANY BUSINESS, regardless of its type or size, be it retail, wholesale or manufacturing—whether it be a multi-plant or single industrial enterprise—needs a good foundation. Without an adequate chart of accounts and explanatory manual, an organization is like a ship without a rudder, for a proper chart of accounts is essential in preparing a true and correct statement of financial condition and statement of profit and loss on a comparable basis year in and year out, so that management can correctly interpret the changes in its condition.

Krebs, in *Outlines of Accounting, Volume II,* states that the ideal chart of accounts should possess the following characteristics:

1. The name or title assigned in each case should be sufficiently explicit and full as to make reasonably clear the items to be debited and credited.
2. The accounts should be numbered in order to facilitate proper arrangement, easy reference, and location of errors.
3. The chart should present an arrangement of accounts suitable to be followed in the ledger. In general, the arrangement should conform closely to the arrangement of items in the financial statements most frequently constructed.
4. The chart should be sufficiently detailed but should avoid needless multiplication of accounts.
5. The chart should be accompanied by an adequate set of instructions.

A definition for a chart of accounts is a uniform, systematic listing of assets, liabilities, capital, income and expenses in a logical order, giving account names and numbers so that accurate financial statements may be extracted and prepared in the sequence that they will be shown on the balance sheet and statement of profit and loss. It should provide for future expansion, so that any new accounts can be inserted in time of need, or revisions made in the present accounts. The chart of accounts should be reviewed annually and revised whenever any major changes take place. Accounting principles are not static. They change with time.

A manual of accounts supplements the chart of accounts. It is a handbook of accounting policies, standards, and practices governing the accounts of a business enterprise. It describes the use and the general operation of the books of account and goes hand in hand with the chart of accounts. It defines the type of items which go into and the proper charge or credit to the accounts shown in the chart of accounts.

The Chart of Accounts

In the preparation of a chart of accounts, the type of business and the manner in which the financial statements are to be prepared should be taken into consideration. The individual receiving the assignment or revising or setting up a chart of accounts, should first acquaint himself with the type of information that management needs or wants in order to properly interpret the activities of the organization, for the chart of accounts will not always follow exactly the set-up of accounts which might be made according to a text book. It may and does change to follow the information and the order and the manner in which management wants its financial statements presented. It is advisable, also, to visit the plants, if the organization is a multi-plant operation, and discuss the chart and manual of accounts with the people doing the detail work, talking to the individuals responsible for interpreting what account or accounts are to be charged and/or credited and to those who do the posting and the preparation of the financial statements.

When the first draft of these instruments are prepared, all interested people in the main office, the field, and the company's public accountants should receive copies and their criticism and suggestions asked for. When these have been received and examined, the chart and manual of accounts should be revised to take into consideration the suggestions which have been finally approved by the comptroller, after the supervisor in charge of the revision has indicated his agreement or disagreement. A second draft should be sent out to the plants if one has a multi-plant operation and an additional request made for further recommendations in light of the approved revisions. This request will be the last one made to the field. After the answers have been received, the chart and manual of accounts will again be changed to incorporate the recommendations that have been accepted.

The final copy of the chart of accounts can be prepared on a ditto master, stencil or multilith. Sufficient space must be allowed for any future changes and for expansion in the business activities. When a new chart and manual of accounts is first used, kinks will turn up necessitating corrections even in "final"

MAIN CHART OF ACCOUNTS

Accounts Numbered	Class of Accounts	Page No.
100-199	ASSETS	
100-139	Current Assets	1 - 3
140-159	Fixed Assets	4 - 8
160-179	Deferred Charges and Prepaid Expenses	9
180-199	Other Assets	10 - 11
200-299	LIABILITIES AND CAPITAL	
200-249	Current Liabilities	12 - 14
250-259	Fixed Liabilities	15
260-269	Deferred Credits for Income	16
270-279	Reserves	16
280-299	Capital	17
500-2000	PROFIT AND LOSS ACCOUNTS	
500-599	Income	18
600-649	Purchases	19 - 20
650-699	Labor	21
700-799	Factory Overhead	22 - 27
800-899	Selling Expenses	28 - 30
900-999	Shipping & Delivery Expenses	31 - 32
1000-1099	General and Administrative Expenses	33 - 36
1100-1149	Additions to Income	37
1150-1199	Deductions from Income	38
1200-1249	Corporate Income	39
1300-1599	Corporation Expenses	40 - 50

EXHIBIT 1

and "last" revisions. However, this will pose no problem if sufficient space is allowed in each classification of accounts for additions and/or corrections. A chart of accounts should, preferably, be housed in a loose-leaf ring binder on 8½" x 11" size sheets, properly numbered and indexed so that quick reference and insertion of additional sheets or revisions can be made with ease. When the chart of accounts represents a revision of a previously existing one, there should be some cross reference to the old account numbers. A sufficient number of copies of the chart should be prepared so that all individuals who have need to refer to same have a copy available. This should include copies for the public accountants as well as company employees.

The chart of accounts for a manufacturing enterprise, listing the major classification of assets, liabilities and capital, and profit and loss accounts should begin, as shown in Exhibit 1, with an index which would be a summary listing of the major classes of accounts, their code numbers, and the pages on which found. The inside pages would then provide the detailed accounts within each major

DETAIL CHART OF ACCOUNTS (PORTION)

ASSETS

New Account Nos.	Current Assets	Old Account Nos.
100-1, etc.	Cash In Banks - Regular Accounts	102
101-1, etc.	Cash In Banks - Payroll Accounts	103
102-1, etc.	Cash In Banks - Special Accounts	102
103-	Cash In Banks - Divided	102
1	Common	
2	Preferred	
104-	Bank Transfers (Own Plants)	129
105-	Cash On Hand (Imprest Petty Cash Fund)	101
1	Petty Cash	
2	Petty Cash Exchanges	
106-	Marketable Securities (Detail in Subsidiary Ledger)	110-2
1	U. S. Government Securities	
2	State and Municipal	
3	Corporate Securities - (Other Than Associated Cos.)	
	A. Stocks	
	B. Bonds	
107-etc.		

EXHIBIT 2

DETAIL CHART OF ACCOUNTS (PORTION)

General & Administrative Expenses

New Account Nos.	Fixed and Semi-Fixed Costs	Old Account Nos.
1031-	Rental of Leased Equipment	
1	Punched Card (I. B. M., etc)	
	Others	
1032-	Depreciation - Automobiles - New & Used	940-2
1	Automobiles	
2	Station Wagons	
3	Buses	
4		
1033-	Depreciation - Furniture & Fixtures - New & Used	940-1
1	Office Furniture & Fixtures	
2	Factory Furniture & Fixtures	
3	Air-Conditioning Units	
4		
1034- etc.		
1035-		

EXHIBIT 3

TABULAR IDENTIFICATION (PORTION) OF DETAIL ACCOUNTS
COMMON TO THE SEVERAL MAJOR GROUPS

Exp. No.	Name of Account	A/c 600 Prime Cost	A/c 700 Factory Overhead	A/c 800 Selling Expenses	A/c 900 Shipping and Del. Expenses	A/c 1000 General & Admin. Expenses
1	Direct Labor	xxx	---	---	---	---
2	Indirect Labor	---	xxx	---	---	---
3	Sal. & Wages - Clerical	---	xxx	xxx	xxx	xxx
4	Sal. & Wages - Rec. & Storing	---	xxx	---	---	---
5	Sal. & Wages - M. &R. Labor	---	xxx	---	---	---
6	Sal. & Wages - Vacation	xxx	xxx	---	---	---
7	Sal. & Wages - Bonus	xxx	xxx	xxx	xxx	xxx
8	Sal. & Wages - Pay. Taxes	xxx	xxx	xxx	xxx	xxx
9	Sal. & Wages - Corp. Ins.	xxx	xxx	xxx	xxx	xxx
10	Light, Heat & Power	---	xxx	---	---	---
11	Factory Supplies	---	xxx	---	---	---
12	Maint. - Repairs	---	xxx	---	xxx	xxx
13	Protection Services	---	xxx	---	xxx	xxx
14	Miscellaneous Expenses Etc.	---	xxx	xxx	xxx	xxx

EXHIBIT 4

class, allowing room for expansion of each. Exhibits 2 and 3 show how sub-numbers are used to expand each class of accounts. Factory, selling and shipping, general and administrative expenses and corporate income and corporate expenses classifications have been segregated into regular expenses, fixed and semi-fixed costs and fringe costs. In the regular expense section, all salaries and wages are set up as Numbers 1 to 9, so that anything in Account Nos. 700 to 709 (for example) refers to salaries and wages in the factory overhead classification. Similarly, all salaries and wages in selling expenses are set up in Account Nos. 800 to 809. In a like manner dues and subscriptions, insurance, general expenses, etc.. have the same last two digit designations in all the expense groups. Therefore, since many of the detail accounts are applicable to more than one major class, they could be listed in the chart of accounts on a tabular basis as shown in Exhibit 4, a helpful device to simplify comprehension of the chart.

The Manual of Accounts

As previously stated, the manual of accounts describes the use and the general operation of the books of account and goes hand in hand with a chart of accounts. It defines the type of items which go into, and the proper charge or credit to, the accounts listed in the chart. Generally, the procedure to be followed in preparing and revising a manual of accounts is the same as required for a chart of accounts. There are various specific ways a manual of accounts

SAMPLE PREFACE TO MANUAL OF ACCOUNTS

General

The accounts have been arranged in this manual in the order in which they will appear in the monthly financial statements. The numbering system has provided for future expansion. The classification of accounts is a list of all accounts in the general and subsidiary ledgers, showing the new account numbers in the left hand column and the old account numbers in the right hand column, as thus:

New Account No.	Old Account No.
101	108

No new account is to be added to this chart of accounts without written permission from the controller's office. This rule is necessary, in order to maintain uniformity and consistency in the contents of the balance sheet and profit and loss statements of all the plants. It will enable management to properly interpret and analyze all accounting records. Note that certain accounts which appeared in the old chart of accounts have been eliminated. It was felt that these accounts were no longer needed or more suitable accounts have been substituted. Notations shall be made in the general ledger of special transactions or adjustments to enable ascertaining the nature of the item without referring to the books of original entry.

Books of Record

The books of record of each corporation are to consist of a general ledger, together with such subsidiary ledgers as are necessary to a proper continuous analysis and reflection of the detail of control accounts.

The general ledger is to be maintained on individual ledger cards where machine accounting is in use or on loose leaf ledger sheets of standard general ledger rulings where hand posted operations are used. Individual ledger cards or columnar ledger sheets are to be set up for all sub accounts and are required for use on accounts for which an analysis of the account is to be shown, such as cash in banks, marketable securities, accounts receivable, etc. The general ledger of each plant shall consist of accounts appearing in the chart of accounts which apply to its operation. It is not necessary to open an account for all items in the chart of accounts.

Subsidiary ledgers shall be maintained for all general ledger control accounts when a detailed, continous analysis of the contents is necessary to either properly record all transactions or to correctly show the financial condition and operations of each company. Examples of subsidiary ledgers are as follows:

1. Insurance register
2. Plant ledger
3. Notes receivable and notes payable registers
4. Investment ledger
5. Accounts receivable ledgers or cards
6. Accounts payable ledgers or cards
7. Factory expense ledgers or cards

EXHIBIT 5

can be set up just as there are difrerent ways a chart of accounts can be prepared. Two will be suggested here.

One method "spells out" all entries which apply to the particular account. The actual debits and credits affecting the account are explained and related accounts affected shown. This will result in a large manual and will entail a great deal of effort and time. However, it is desirable in very large organizations with many plants or divisions. Another presentation is to describe the

SAMPLE EXPLANATIONS FOR MANUAL OF ACCOUNTS

(a current asset account)

Account No.

106 Marketable Securities

Include herein the cost value of all securities for which there is a ready market. The following information is to be reflected in a subsidiary ledger:

Date of Purchase	Premium Paid
No. of Shares and/or	Amortization of Premium Paid
Face Value of Bonds	Date Sold
Type and name of Investment	Selling Price
Due Date	Profit or (Loss)
Cost (Exclusive of Premium)	

This account is subdivided as follows:

106-1 Marketable Securities - U. S. Government Securities

Include herein the cost value of all U. S. Government securities except U. S. Government Savings Bonds and U. S. Government tax notes.

106-2 Marketable Securities - State and Municipal

Include herein the cost value of all State and Municipal securities purchased for investment.

106-3 Marketable Securities - Corporate Securities

Include herein the cost of stocks and/or bonds of corporations not associated with the organization for investment.

(a profit and loss account)

Account No.

700 Factory Overhead

Include herein expenses other than Prime Costs, i. e., Direct Materials and Direct Labor.

The expenses have been arranged so that all salaries and wages are grouped together as well as other related expense items.

The standardized Profit and Loss Statement will follow the same sequence.

701 Salaries and Wages - Indirect Labor

Include in this account labor which is performed in connection with production material, but which cannot be charged directly to a specific job or product, i. e., of a service nature.

702 Salaries and Wages - Superintendents, Supervisors and Foremen

This account is to be charged with the salaries and hourly rates of Superintendents, Assistant Superintendents, Supervisors, Foremen, and Assistant Foremen who perform duties of an overall nature.

703 Salaries and Wages - Quality Control

Include in this caption compensation of those employees whose job is to make tests of material and supplies used in the factory and who process customer complaints insofar as quality is concerned. This account is to be charged with the weekly salaries paid employees. Include herein the salaries of the Technical Director and the Laboratory Staff.

EXHIBIT 6

nature of the account and what goes into it, without illustrating the journal entries affecting it or related accounts. In determining which method one should use, consideration must be given to the type of organization, i.e., centralized or decentralized, size of the company and calibre of accounting personnel. Ex-

hibit 5 is an example of a manual preface and Exhibit 6 illustrates explanations which would be shown in a section of a manual of accounts for a medium-sized company. It includes a preface which contains general instructions and leads into more detailed definition of the content of each account.

Chart and Manual of Accounts Serve a Need—Is It Yours?

As said at the start the chart and manual of accounts go hand in hand. One is part of the other. They are a team and both are essential to any organization. Too many companies prepare only a chart of accounts and do not realize the importance of the manual. The difference in opinion and interpretation given to the handling of accounts shown in the chart alone can only be overcome by a written manual. Even with a manual, there may be some doubt as to what account a particular item should be charged or credited to, but at least these doubts or differences of opinions become minor and will in time be eliminated. Therefore, detailed instructions as to the nature of the accounts in written permanent form is a necessity.

An Important Questionnaire

To be fully effective, the chart and manual of accounts must remain dynamic and continue to reflect current business conditions. Your answers to the following questions will determine whether it is time you gave management a more modern tool than it now has to guide them in keeping costs down:

1. When have you last reviewed your chart and manual of accounts?
2. When have you last revised your chart and manual of accounts?
3. Is your chart and manual of accounts a patchwork of revisions and changes?
4. Has your company expanded and built additional plants during the past year?
5. Has your company changed its accounting policy in the past year?
6. Has your company changed from a centralized to a decentralized accounting system?
7. Have new accounting concepts made your chart and manual of accounts obsolete or awkward?
8. Does your chart and manual of accounts enable you to present to management the accounting information that it needs and wants?
9. Has work simplification methods or advances in paper work made desirable and advantageous a change in your records, forms, or reports? Will a revision of your chart of accounts and manual of accounts aid in this change?
10. Has your company changed its corporate setup during the past year?

A Short-Cut Tabulating Method of Inventory Control

by

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The control of inventories with relatively inexpensive punch card accounting equipment is a frontier area in tabulating machine utilization. Current standard procedure revolves around the explosion deck approach which has the disvantage of requiring a considerable volume of cards and processing time. This article briefly describes a practical new approach to the control of inventories without the volume of effort inherent in the explosion technique.

"SEE IT BIG!" has been the watchword in industrial management training during the past few years. Management trainees have been urged to dream big, think big, and act big. This training concept has taken hold and, as a result, the present crop of new managerial talent looks for, and really sees, the big picture. The benefits from this type of thinking have been unbelievably numerous. And yet there is evidence that an equalizing monster has been created simultaneously. Because we have unconsciously accepted the habit of seeing everything big, the minor problem seems to have disappeared, and each little problem is magnified to the status of a major project. Perhaps this makes another big problem! At all events, we have tried to deflate our problems where we could.

We Made the Order-Coding Problem Small

The problem of machine inventory control as experienced by the Rapids-Standard Company is an example. It all started with a one-paragraph letter from our manufacturing vice president requesting that we investigate the possibility of using our tabulating equipment for inventory control. This request sounded reasonable enough. Our initial attitude was positive and, of course, our thinking soared to the big picture. We visualized a successful pilot experiment, then complete inventory mechanization first at our No. 1 Plant and next at our large No. 2 Plant. Then the problems became apparent. Our manufacturing division made us aware of the numerous specials that flow through our plants daily, which make it almost impossible to devise a machine system to handle inventory control efficiently, quickly, and economically. If the percentage of special situations is too great, system mechanization appears futile.

This problem seemed so big that we almost made a decision to drop the project. Fortunately, a short study of

our specials revealed that the majority were not really specials at all but simply modified standards. By using a series of code numbers we found we could correctly identify approximately 98 per cent of orders received and the problem was immediately minimized to almost none at all. Our production people grasped quickly the product coding idea and agreed it was almost a foolproof identification. The remaining 2 per cent of orders which were true specials could easily be incorporated into our tabulating system on an exception basis.

What Card Volume for Parts?

The recommended system seemed relatively uncomplex; back up each product model with an explosion deck of component parts, pull these explosion decks, using incoming customer orders as a basis, and, finally, through the necessary steps of sorting and tabulating, come up with a summarized report of all component parts committed against orders. It would then be a simple matter to deduct these commitments from perpetual inventory tabulating cards and furnish a perfect component part inventory report. However, from other companies using tabulating installations for controlling inventory, we found that a collator was considered essential to the recommended method of machine inventory control. We did not have this equipment. It was also noted that these installations were backed up by rows and rows of tub files, containing explosion decks and we could see immediately that the necessary card volume would be far too great for our relatively small tabulating installation. To double-check our findings, we called in our tabulating machine representative who did an excellent job of computing the card volume requirements for our smaller (No. 1) plant. His analyses confirmed our fears. The card volume for mechanized inventory control at this plant alone would impose a severe strain on our machine capacity.

With our deadline for installation of this system at this plant only two weeks away, we had to admit we had a big problem and faced defeat on a phase which we thought would give us no trouble whatsoever. In desperation, we "hashed" and "rehashed" the entire system over in our minds, looking for loopholes. We finally backed off and decided to stop this line of thought. We would need some revolutionary idea if the program were to be completed. The idea came. It was that we would not need explosion decks. This intriguing possibility led us from one new idea to another until we arrived at the solution that we now use as the basis for our machine inventory control. We are now controlling our No. 1 Plant inventory with a card volume equal to approximately ten per cent of what we would have used with the standard system, in short, no explosion decks

and with no additions to our tabulating equipment.

Preparatory Steps in the Installation

The installation of this new system of control required several basic steps. All product models and component parts were charted to give us an overall picture of the interchangeability of parts among products. Using this master chart, it was then possible to regroup our products according to the greatest interchangeability of component parts. We ended up with approximately twenty product groups and an equal number of component part groups. In these groups, many of the component parts were interchangeable in varying degrees with the products shown and, of course, some of the parts were not interchangeable with any of the products in that group. The main point of this explanation is that product groups were formed which contained the greatest interchangeability of component parts.

A model card was key-punched for every product produced at Plant No. 1 containing the product model number and description. (Later these cards were gang-punched to provide a supply for daily use.) An inventory card was key-punched for each of our component parts, showing the latest inventory balance for each part. These could be called our perpetual inventory cards. A three-part control number consisting of eight digits was then devised, to be based on the three consecutive totals which our tabulating machine would produce (minor total, intermediate total, major total). Reading from right to left, the first four digits represented the minor total, the next two digits represented the intermediate total and the last two digits represented the major total.

Our model cards and our inventory cards were coded with this control number according to our rearranged group pattern, that is, when we assigned the control number 00-00-0001 to a model card, we also had to code all of the component part inventory cards used exclusively in that product with the same number. This meant that, when we tabulated the sale of a particular product during any period, this minor total would represent the deduction necessary from each of the component part cards similarly coded. It also meant that, when we totaled a certain group of products (intermediate group), this total represented necessary deductions from component parts interchangeable with all products in that group. The same principle applies to the major total, which is merely the total of two or more groups and which affects parts interchangeable to all groups within that particular pattern.

Some explanation is necessary here. Although it was possible to code all products and parts with minor total code numbers, we could not code any product model cards with intermediate or major totals, since those totals were

unknowns. Therefore, inventory part cards were coded with intermediate and major total numbers which would be assigned to a total summary card by the tabulating machine.

Operation of System

To illustrate more clearly how this system operates, we shall follow through a few steps of the system. During each week, as customer orders are received, product model cards are pulled and quantities key-punched on these cards. At the end of each week, these model cards are sorted by the eight-digit control number and tabulated. (This sort places these cards in the groups previously arranged from our interchangeability chart.)

As the first group of cards goes through the tabulating machine, summary cards are punched automatically for all minor totals (individual products), intermediate totals (group of products), and major totals (two or more groups of products). Each of these summary cards contains the control code number assigned to it in the master group plan. As stated above, we know that each coded summary card has its counterpart in one or more inventory cards. The model summary cards, which represent a summary of all of our product sales during that period, are then sorted together with the inventory component part cards by control number. We find, after this sort, that each summary card is followed by a group of inventory cards which are affected by the quantity shown on the summary card. These cards are then placed in the gang-punch machine and the quantities in each summary card are gang-punched into its group of inventory cards.

Accordingly, we end up with a deck of inventory cards which have punched in, not only the previous inventory balance but also the amount which must be deducted from that balance. It becomes a simple matter to run these inventory cards through the tabulating machine, which deducts the gang-punched quantities from the previous balance and furnishes us with a weekly perpetual inventory status report. At the same time, this report is being furnished, a new inventory deck is being summary-punched with the new inventory balance of each part for next period use.

Production Control Reports, Too

Our system was not designed merely for inventory control. We are presently furnished the following reports:

1. Daily product requirements report covering our fast-moving hand truck line. This report serves as a production order for our welding and assembly departments.
2. Weekly caster requirement report by product and due-date, which serves as a production order for our caster machine department, welding and assembly departments.
3. Weekly open production order report, which shows all open production orders and due-dates.
4. Weekly purchasing guide, which is a further breakdown of our requirements into purchased parts.
5. Monthly (quantity) sales analysis by territories.

6. Monthly product recapitulation for our cost department.
7. Weekly component part inventory status report.
8. Usage reports as required.

The total time for all details connected with these reports is approximately five-and-one-half hours per week. If we were concerned with controlling inventory alone, we estimate we could do so in approxiamtely two-and-one-half hours per week and this time includes all clerical and machine time. Initially, we felt this system would take a minimum of twenty hours per week. The seventy five per cent reduction in this estimated time has been a pleasant surprise indeed.

Basic Principles Re-stated

In conclusion, the basic principles of this system may well be summarized. We group products by the greatest interchangeability of component parts. (Reason: If a group total of twenty products can represent the deductions from ten component part cards, you immediately eliminate two hundred cards which ordinarily would have to be included in explosion decks. Therefore, if the products number in the hundreds or thousands, savings in card volume will be in thousands and possibly ten of thousands). We set up a three-total control number (minor, major, intermediate) and code all products and component parts with these numbers. Thus, we by-passed high card volume and still supplied the tabulating machines with the data for making usage deductions in detail for inventory control balances. We saw the problem small and accomplished a big job!

Fast and Flexible Inventory Control by Mechanization

by FRANK E. KLECAN

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The aircraft industry presents a unique problem in inventory control because of the amazing complexity of current-day airplanes. The solution to this problem instituted by one manufacturer involved the utilization of mechanical equipment of several kinds. The author here presents us with a capsule view of their procedures.

EACH OF THE AIRPLANES being produced today is a complex aggregate of many metals and thousands of parts. A large proportion of these parts are manufactured in the aircraft plant and still other thousands are purchased from a variety of vendors. The problem of inventory control, to provide a purchased or fabricated part to the assembly line in the quanti-

ties needed and at the time needed, is not a simple one, especially when such parts are needed on various assembly lines or sub-assembly operations for various type planes at the same or different times. Various types of material such as aluminum, magnesium, stainless steel, tubing, bar stock, forgings, castings, small purchased parts, major purchased parts and miscellaneous small parts, are all stored in convenient but different areas and the problem of coordinating the procurement, storing and disbursement in proper quantities must be very carefully coordinated with production requirements.

In general, the method of arriving at requirements varies, based on type of material or parts. On certain high-valued parts only the exact contract quantities required are ordered and particular attention is given to the scheduled due date. On raw material and certain controlled purchased parts, procurement is based on the airplane requirements, with a percentage added for nonrecurring uses such as tool try, mock-up, development, etc., and safeguards, to assure that the procurement action is adequate. On some bulk items for which requirements cannot be specifically determined because of the nature of the item, procurement is established and adjusted as usage dictates. The decision whether to procure full contract quantities of material at one time or to schedule receipts in smaller increments is based upon the size of the contract, the length of time the contract has to run, and the airplane delivery schedules. Material schedules are based on the production schedule and in detail by the lot structure (number of airplanes in a particular lot). A setback of approximately 30 manufacturing days from the first need date is used for receiving, inspection, inventory, and disbursement to using department.

The vast amount of detailed record-keeping necessary to maintain historical information to comply with complex management and contractual requirements requires laborious analyses of some 30,000 different cards in order to establish a true position. These analyses are subject to the human error factor and, upon completion, the information may be out of date and of little value for management control. Additional contracts for different types of activity have multipled these problems and they have become ever more complex.

Evolving The Control Plan

About two years ago, a committee was established with a representative each from cost accounting, material planning, and industrial engineering staffs, to study our record-keeping methods, with the objective of revising the costly, voluminous, manually-maintained inventory history, procurement, requirement, and disbursement records. This committee had, as its objective, control of material which

would be regarded as achieved when material shortages or line stoppages ceased and material was in receipt on the day it was needed. This committee evolved a long-range program which contemplated eliminating entirely the manually-maintained records, by supplanting them with posted quantitative productive inventory records combined with mechanically maintained quantity and price records for determining inventory position by item, by inventory account, or by contract. With this new system, information would be available within a matter of hours after the last document for the accounting period had been processed.

An initial step involved the redesignation of responsibilities for quantity and price. In the past, the material planning department had re-averaged prices after each receipt. Their primary responsibility in the future involved the keeping of accountability records of quantities received, disbursed, and on hand only. The responsibility of maintaining average prices, was made a part of the mechanized program maintained on tabulating equipment and the accuracy of the average prices, was made dependent upon the audit operation of the material planning department. It was also necessary to differentiate between planned and unplanned requirements in order to adequately control procurement activities for necessary planned requirements and to provide for the replacement or purchase of material required for unplanned requirements.

Each item in inventory was identified with a code based on a system which provided for nine digits. The first two digits represents the inventory account, the next four digits indicate the numerical designation of the specific item of material, and the last three digits provide for expansion in the series or to segregate sizes within a particular item. Cards were set up for each item on this basis. A manufacturing code numbering system was also developed for use in programming input information in the punched card. A code was also established for each type of transaction to automatically reflect on the tabulating records, increases or decreases on unfilled production requirements, order position, on hand, to be ordered, receipts, disbursements to planned requirements, and disbursements to unplanned requirements. Preliminary trial runs were made for several months and dual records were maintained during that period to make sure that the procedure had been properly and adequately planned and that the timing on processing of all documentation resulted in accurate reporting.

What the Bookkeeping Machines Do

The material planning department establishes the requirements for each inventory item and designates the contracts and airplane on which those requirements exist. Purchase order re-

PRODUCTIVE INVENTORY RECORD
10-1048-4 Skid Detector Assembly

PRODUCTIVE INVENTORY RECORD
10-1048-4 Skid Detector Assembly

					ENTRY							BALANCE TO DATE						
						Requirements			Disbursements			Unfilled Requirements						
Material Code	Date	Contr. No.	Trans. Code	Document	Work Order No.	Prod.	Spares	Ord.	Rec.	Prod.	Spares	Excess Surp.	Sur-plus	Prod.	Spares	On Order	On Hand	Sur-plus	To Be Ordered	Proof
T 500 360 40	55 Oct. 14	20					1 00	53	50		50			00	50	03	00	00	00	47	T 500 359 46
T 500 360 40	55 Oct. 14	21				3 05		3 55	1 70	1 44			02	1 64	50	1 53	24	02	00	00	T 500 360 36
T 500 360 40	55 Oct. 14	21	11	1 838 70	6 288 40																
					41 350 10				08					1 64	50	1 50	23	03	00	00	T 500 360 04

EXHIBIT 1

quests are initiated to cover the requirements and a copy of this request is immediately forwarded to tabulating department for inclusion in the "on order" field of the applicable inventory card, which places starting information on tabulating cards. In this section of the article, however, we will deal with the posting operations. All documents effecting a physical movement of material are serialized in the storeroom to make sure that all movements of material are recorded. The documents are then transmitted to the material planning department for posting to the quantity control records.

The documents are posted on bookkeeping machines to the Productive Inventory Record (Exhibit 1), for each inventory item. At the same time the applicable documents are similarly posted to the Procurement History Record (Exhibit 2) to reflect immediately the outstanding position of all purchase orders. The former provides a complete and permanent record of all transactions affecting requirements, procurement, receipts, transfers, and disbursements with full documentation. It also provides balance-to-date figures against each transaction posting on unfilled requirements, on order, on hand, recoverable material, declared surplus and to be ordered. The latter provides information pertaining to all procurement, purchase request number, purchase order number, vendor, quantity ordered, arrival schedule,

PRODUCTIVE INVENTORY PROCUREMENT HISTORY RECORD

Skid Detector Assembly

Contract Pr. Date	Vendor P.O. Date	Remarks	Arrival Schedule Date	Arrival Schedule Quantity	Ordered	Received	Balance	Date	Receiving Memo No.
20	Hydro Aire Inc.		REC. 67	3	70	67	03	55Dec. 16	
165859-A	DI 08272					03	00	55Dec. 16	048880
4-20 53	5 1 53								
21	Hydro Aire Inc.		REC. 169	139	308	169	139	55Nov. 16	
165874-A	DI 09141					01	138	55Nov. 16	048881
6 1 54	6 29 53					04	134	55Nov. 16	048983
						14	120	55Nov. 16	048839
						31	89	55Dec. 16	053643

EXHIBIT 2

and record or receipts and balance still due from the vendor. The Material Control Card (Exhibit 3), for recording the requirement and procurement scheduled for all productive items and for recording lot requirements and disbursements of material against those requirements, are still hand-posted, but the information on these records is recorded in such a manner that they reflect an instantaneous position on any one item.

What the Tabulating Equipment Does

After postings to these records, the inventory transaction documents showing the transaction code are transmitted to tabulating department which key punches and processes all the documents on a daily basis. On documents which cause a re-averaging of average prices, key punch operators also punch the unit price. Inasmuch as separate records are maintained on cost reimbursement and fixed price type contracts, separate prices are also maintained for the different type contracts on each item. At the end of each week all transaction codes which affect the inventory and average inventory price, are selected and are processed against the Stock Balance Summary Cards (Exhibit 4), and mechanically a new average price is obtained as directed by the transaction code. This calculation is done on tabulating equipment with a far greater degree of accuracy than can be accomplished manually and also at a considerable cost reduction. Re-averaging of prices is done only once a week and all disbursements and other transactions are priced at that weekly average rate. After the new average prices are determined, they are inserted on all Material Cost Distribution Cards, (Exhibit 4), for the insertion and entry of the price on the tapes used in posting to the accounting records.

Each week, the material cost distribution cards are listed on a tabulating tape, which details all of the transactions affecting a particular inventory account, and another tabulating tape

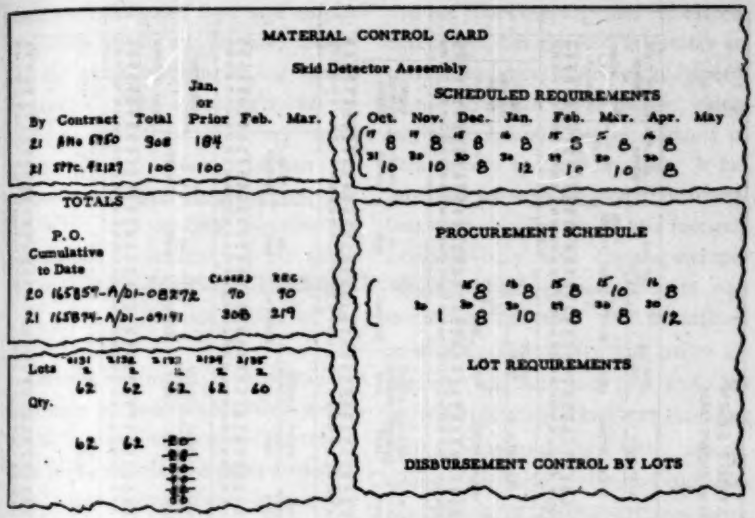

EXHIBIT 3

listing, in contra account order, the charges to the respective accounts from each inventory account. Simultaneously, summary cards are reproduced for a summary tabulating tape for posting to the corporate accounting records. These accounting records are then correlated with the records required for establishing material position by using the detailed daily cards and, after matching them with the master stock balance summary cards, various weekly reports are prepared. One tabulated report is prepared to show for each individual item, the inventory on hand at the beginning of the week and the average unit price and also all of the documentation covering transactions increasing or decreasing this inventory, also with unit prices and extended values and the inventory at the end of the period at the new average unit price. This report is checked each week to insure that the average unit price for each of the items is within the maximum/minimum range.

The stock balance summary cards, as of the end of the accounting period, are also the source of tabulated reports by item number, reflecting the unfilled requirements, on order, on hand and to be ordered, with quantities, and dollar values for each item in inventory and separate totals for each inventory account. For the purpose of making this report more useful, it was also decided to maintain these stock balance summary cards by individual contract within the basic cost reimburse-

MULTIPLE LAYOUT FORM
FOR ELECTRIC ACCOUNTING MACHINE CARDS

EXHIBIT 4

ment or fixed-price type and similar tabulating reports are prepared reflecting the same information, in detail, by contract. The inventory values established on these summary cards agree with the inventory balances on the corporate subsidiary ledgers, and the other information permits the preparation of material reports which indicate to management anticipated costs prior to the completion of the contract.

These tabulating tapes, in detail by item number, enable an analyst to detect at a glance any out-of-line condition. For example, the tapes automatically reflect disbursements beyond the actual planned requirements and an investigation is made of that condition. Immediate corrective action is initiated to obtain the return of the over-disbursed parts or to obtain correcting documentation, either to change the dishbursement distribution to an unplanned requirement account or to determine if the requirement, as originally established, had been changed and had been overlooked in its establishment on the record cards.

Detailed Inventory Control Now Practicable

This integrated system, a combination of bookkeeping and tabulating equipment, has resulted in greater accuracy, legibility, flexibility, and speed. It has permitted us to process, calculate and summarize large amounts of data rapidly and economically. It has provided us with by-product information mechanically, which was formerly available only with the expenditure of considerable clerical effort at very infrequent intervals. It has enabled us to maintain average unit prices accurately and mechanically and has provided us with priced and extended listings mechanically each month, whereas formerly it required considerable time to obtain these listings twice a year. It provides us with a mechanical monetary material position by contract and inventory account each month.

Although the system has been in operation for only a short while, the information obtained from the reports has revealed many conditions which had been neglected. The results have proven the value of mechanization of inventory record-keeping and have made possible better and more rapid inventory information at a considerable saving in cost.

Accounting for Labor Costs in the Chemical Industry

BASED ON ACCOUNTING PROCEDURE SURVEY NO. 1639

THE SUBJECT OF bracket labor standards, as applied to the chemical industry arose in group discussion at the 1955 cost conference. As is often the case, mention of the subject itself also raised many questions in connection with it including a definition of the term. On inquiry, a member supplied the following definition of bracket standards (covering labor and other elements of cost):

> "The bracket standards for a product are the predetermined costs for specific levels of production based on the most economical methods of operations under realistic and reasonably favorable conditions."

Indicating support for this type of standard, another member connected with the same company stated that bracket labor standards are a means of getting a sense of proportion on specific segments of production. Through the use of such standards, the production factors are highlighted and significant changes in cost below standard capacity levels are "bracketed", i.e. the production ranges at which they occur are disclosed. For instance, if you have a capacity of 100,000 pounds and you operate at 50,000, using one instead of two stills, there is a difference in the amount of labor and supplies used. A bracket is, therefore, set up at that particular point and production is measured on the standard for 50,000 pounds rather than the inventory standard of 100,000 pounds. Some discussion followed on the subject of how the variance should be treated, a number of those participating indicating a charge to cost of goods sold and others questioning whether a single production variance was adequate and preferring additional breakdowns by specific causes. The treatment just described, however, is not used by one member in a company where most of the chemicals are processed in one department. In this case an engineered standard for the full operation is used.

The Questions Asked

Interest in the topic was such that in order to bring to light the practice of additional companies in the chemical industry, N. A. C. A., Technical Service sent out Question No. 1639 to a diverse group of companies in this industry. The members addressed represented large companies manufacturing a wide range of products, from pharmaceuticals to heavy industrial chemicals. The questions asked were as follows:

1. Do you use "bracket labor standards"? (as defined above)
2. Do you develop separate labor standards for each operation in your process, e.g. make-up, treating, centrifuging, and drying?
3. Do you develop one overall labor standard for all the work done in a given department, using some such yardstick as number of hours per 100 pounds for the whole operation?
4. Other procedures—please describe.

Fifteen replies were received. From these it was evident that the variety of procedures being followed is almost as diverse as the products produced. However, twelve of the fifteen companies reported using some form of standards, broken down into standards for operations, processes, or departments. There appears to be little uniformity respecting the specific type of breakdown. Five of

the twelve indicated that they also develop product or product line standards. The remaining three companies are using actual costs for all purposes. The replies, given below, will serve to illustrate the different procedures being followed better than additional description. They are grouped into replies from companies using standard costs and those using actual costs.

Replies Received from Companies Using Standard Costs

Reply No. 1—Producer of Organic Dyes, Chemicals and Intermediates

Question No. 1. Yes—we do use bracket labor standards as defined.

Question No. 2. In our producing department, we develop separate labor standards for each product for the completion of an operation (or batch) which includes make-up — treating — centrifuging — pumping — filter pressing, etc.

A study is made of the operation (or batch) requirements as to the pounds of materials handled, the time required for completion, the testing and attention one product may receive in relation to another, the complexity in handling (such as the equipment used and the need for transferring from one vessel to another), and the method of transfer used. In other words, a thorough study is made of the manufacturing process. Then a time standard expressed in hours is given to the product. The development of this standard time is also in relation to what is considered realistic and favorable manufacturing conditions under normal volume and using the equipment designed for the process. In scheduling production, variation from most economical methods are necessary and here the normal scheduling would prevail. For example Product A might have a total time of 30 hours. We do not break it down into its separate process components. When the operation is started, the full time is allocated: It often happens two products with almost identical yields may have quite different time factors.

Most of our finished products go through a drying process consisting of either drying ovens or cylindrical dryers or vacuum dryers. All of our costs of operating the drying department area accumulated and a cost per 100 pounds of dry "as is" weight is determined. I mentioned "as is" weight because we standardize our products (dyestuffs), which weights are generally different from the "as is" weight.

The same procedure is followed in our grinding room and the ground "as is" weights are related to the total cost of the department to obtain a cost per 100 pounds.

Question No. 3. The answer to number three question is that we do not develop one overall labor standard for all work done. However, we do summarize the standard hours by producing departments (as explained above) and relate them to the expended direct labor hours by department to determine the variances.

Reply No. 2—Producer of Heavy Chemicals

We do not use a conventional standard cost system with engineered standards, variation accounts, etc. In lieu of this, we control our production costs by means of a budgetary or forecasting system against which actual results are compared.

Production costs are forecast by applying estimated production quantities to pre-determined flexible standards. I use the term, flexible standards, inasmuch as they are initially established by conference between our production and accounting people, using historical information as a basis for determination. Revisions to these standards can be effected by submission of permanent or temporary revision requests, which provide for full explanation and must be approved by the general works manager. Standards

are set in terms of total dollar cost for the period, unit cost per unit produced, or unit used per unit produced, depending upon the variability of the item covered and the stability of unit price or rate.

The preceding paragraph is intended to summarize our system so that the answers to specific questions are understandable. The answers to the specific questions are as follows:

Question No. 1. By using a standard of total dollars, unit cost per unit produced, or a mixture of the two, we (in effect) use bracket labor standards.

Question No. 2. This question is somewhat difficult to answer. However, I would say that we do not use separate standards for each process step in our operation. We do have separate standards for each major operating facility. To clarify this statement, one of our products is fertilizer grade ammonium nitrate which is packaged in 8 lb. bags. Standards are established for the following operations in producing this material: (1) gas reforming, (2) ammonia synthesis, (3) nitric acid, (4) ammonium nitrate neutral liquor process, (5) ammonium nitrate neutral liquor storage, (6) fertilizer grade ammonium nitrate prilling, cooling and drying. and (7) bagging and coating.

Question No. 3. Normally one standard is adopted which is in terms of total dollars for the period cost per unit produced, depending upon circumstances. Again the area covered by the standard is by major functional division as described in answering Question No. 2.

In closing, I might point out that we are principally producers of basic chemicals and labor is not as major a cost factor in our operation as it would be to a non basic producer or manufacturer producing end products for distribution at retail.

Reply No. 3—Producer of Organic and Inorganic Chemicals

Our business covers several different types of chemical processing, some large, some small, etc., so that, within the organization, we do use all three methods of developing labor standards. However, the application of each of the three methods are studied very closely to make sure that the specific application applies to the type of operation for which it is used.

Within our organization there are three basic methods of obtaining labor standards as follows:

Question No. 1. Bracket labor standards, as defined, are used insofar as a stable manning table geared to the level of production can be used, i.e., manhours required to produce the level of production.

Question No. 2. Separate labor standards are developed within a process, for each operation for which a cut-off point can be determined. Cut-off points in the flow of the process are determined primarily where an in-process inventory accumulates. At each stage of the process, a manning table is prepared to record all operations, and number of manhours required to process a given quantity of production. Total dollar labor costs are figured by means of number of hours times rate per hour. In processes, where manning tables are prepared, the monthly labor charge is carried as a fixed cost each month, with the unit standard cost being determined by total monthly dollars divided by standard level of production.

Variation in the standard level of production is, therefore reflected dollar-wise by a variance in labor costs, reflecting both dollar and per cent of variance.

Question No. 3. In certain processes within our organization, it is unfeasible to have cut off points or cost centers within a process

Therefore, labor standards costs are developed on an overall basis for the complete process. The labor standards developed in this manner are carried as a variable labor cost, which fluctuates with the level of production. Labor costs developed in this manner are primarily based on past experience, i. e. manhours per unit of production over past periods times the current labor rate results in the unit standard cost.

Reply No. 4—Refiner of Petroleum Products

Question No. 1. Our company does not use a bracket labor standard as it has been defined for this question. This is because of the fact that our manufacturing labor is highly fixed by cost centers and the organization remains intact for relatively large variances (15 per cent to 25 per cent) of rate of production. The instances are extremely rare in which personnel must either be released or shifted to other operating units. The cost of training and the risks of unskilled personnel contribute largely to this form of management program.

Question No. 2. We not only develop separate labor standards for each process but record the expense by operations on our books through our detailed methods of coding of accounts. This again is simplified in our case by the fact that personnel of the operations enumerated in the questionnaire rarely have an overlapping in their activities.

Question No. 3. Overall labor standards are used only to the degree that the same cost center (and, therefore, the standard personnel) will successively process different base stocks through the same equipment. In these instances, labor and like fixed expenses are distributed to stocks processed on standard hours or the related unit of measurement for each stock or piece of equipment.

Question No. 4. Other procedures include specific standards by cost centers for such items as fuel, chemicals, steam, etc., premised upon the specific charging stock and, in the case of stills, the degree of distillation.

Reply No. 5—Producer of Specialized Chemicals

The chemical industry is extremely varied and our experience and procedures must, of necessity, touch upon the problem only as it refers to our own particular type of chemicals and chemical manufacturing. Our treatment of direct labor in the cost systems which we use was established after giving consideration to such basic facts as:

1. Type of cost system and nature of production methods.
2. Relative significance of direct labor to total costs.
3. Variation in labor rates.
4. Effect of volume on unit labor costs.

These considerations led us into the establishment of two cost systems, one being a job lot system and the other a process cost procedure, inasmuch as we had to recognize two separate and distinct manufacturing methods. Fortunately, we do not have wide variations in labor rates among production employees in a given plant and/or within individual processes and direct labor is not the predominant factor in unit costs in most of our operations. We have found, however, that unit direct labor cost does vary with volume.

Irrespective of the type of cost system used, we have developed standard unit direct labor costs and standard outputs per manhour. These are not developed for varying levels of production but, rather, what we determine to be a reasonably averaged volume. The standards are developed by product and package size for our job order system and by type of process for our process cost system. Because our labor rates are not widely varied, we need only

determine output per manhour per process or output in terms of production hours per product and extend these by current labor rates to set standards. Actual monthly costs are compared with the standards, developed after due consideration of changes in volume and their approximate effect on output. Resultant variations are analyzed.

Our cost systems are so designed as to give us both actual and standard costs, by element of cost by element of cost by product and package size, or by element of cost by process, depending upon the system involved. They also set forth unit production hours or output per manhour, both as to actual and standard—and do so on a monthly basis.

I guess you would say that we do not use bracket labor standards, inasmuch as our standards are not developed for varying levels of specific production volume. We do develop standards for each process or product and, because of similarity in rates, our average rate is computed on a per plant basis, rather than on a per process or product basis.

Reply No. 6—Pharmaceuticals Manufacturer

Question No. 1. We do not use bracket standards as defined in your letter.

Question No. 2. We do develop separate labor time standards for each operation in the process, such as mixing, centrifuging, drying, but we do not apply separate labor rates to the standard time for each operation. The separate operation time standards, thus, are used more for performance studies than for product cost purposes.

Question No. 3. To the total standard time required by a department to produce a standard yield of a particular product, we apply a departmental labor rate and acquire an overall labor standard cost to represent processing by that department. It is our opinion that the use of total time multiplied by a departmental rate arrives at the same answer, within acceptable limits, as would addition of the amounts arrived at by multiplying standard time for the separate operations by rates applicable only to those operations.

Reply No. 7—Producer of Coal Chemicals, Agricultural Chemicals and Synthetic Organic Chemicals

Question No. 1. This Company does not use bracket labor standards, as defined.

Questions Nos. 2 and 3. This company does develop separate labor standards for each operation in each process. In a few cases, one labor standard rate is used for an entire cost center (which includes two or more operations) but, in no case, is there one overall labor standard for an entire department.

Question No. 4. This company is in the process of installing a typical standard cost system. In some areas, standards are developed on individual products which are produced in definite lot sizes. In other areas, standards are developed on a time-process basis as in oil refineries.

Reply No. 8—Producer of Fertilizers

Our company is made up of six operating divisions. Standard cost systems are presently in use in three of them, with studies being made of the feasibility of installation in others. Due to the varying operations, we have more than one basis or method of setting standards. We give below our answers to the specific questions asked but have supplied the above explanation for what might appear to be contradictions in our answers. The questions are answered in the order asked:

Question No. 1. We do not use bracket labor standards.

Question No. 2. We develop separate labor standards on each operation in some plants

Question No. 3. We develop one overall labor standard for all work done in a given department on the basis of hours manned and output at standard capacity.

Question No. 4. In two of our divisions we use a variable budget standard cost system in which the variable budget rates become our standard rates. In these divisions, the operations are relatively stable and the system seems to work out satisfactorily. In the other division, the operations have not become stabilized yet, as this plant is using a new process and changes are frequent. In this case, we have developed an operating standard hourly rate for each department, based upon its standard input and output. We have also developed a standard allowance for inoperative hours.

Reply No. 9—Pharmaceutical Manufacturer

In connection with the development of labor standards, I will attempt to answer your questions:

Question No. 1. We do not use bracket labor standards.

Question No. 2. We use a consolidated labor standard for operations mentioned.

Question No. 3. We develop overall labor standards for work done in a given department according to product classifications based upon, in most instances, standard minute allowances for the entire operations.

Question No. 4. Our cost standards represent almost 100 per cent operations on the basis of 80 per cent capacity, which means that the rates are developed on an ideal rather than actual operation. This presents valuation on inventory which is considered to be fair cost valuation.

Reply No. 10—Producer of Inorganic Acids and Agricultural Chemicals

Question No. 1. Yes.

Question No. 2. Yes.

Question No. 3. No.

Question No. 4. None other.

Reply No. 11—Soap Manufacturer

Question No. 1. We do not use bracket labor standards as you have defined them. Our standards are not based on varying levels of production. Furthermore, our standards, although realistic, do not include an allowance for lost time, which undoubtedly will occur from time to time in any operation.

Question No. 2. Yes, we develop separate labor standards for each operation in our process.

Question No. 3. We do not develop one overall labor standard, although, in some of our reports, we have a composite standard for a process center, so that the entire operation in the process center can be compared against the actual time spent.

Question No. 4. Other procedures—We report all lost time as a variance from labor standard and classify it according to cause. This lost time is not included in labor standard and covers such activities as delay due to mechanical trouble, learning period, delay due to previous or subsequent operations, etc.

Reply No. 12—Producer of Synthetic Resins

Question No. 1. Yes.

Question No. 2. No.

Question No. 3. Yes.

Replies Received from Companies Using Actual Costs

Reply No. 13—Producer of Bone and Animal Product Chemicals

The answers to *Questions Nos. 1 to 3,* inclusive, are "No", as we do not use labor standards. In answer to *Question No.*

4, we use direct labor charge basis to specific departments, as per actual hours and actual rates worked.

Reply No. 14—Chemists

Question No. 1. No.

Question No. 2. No.

Question No. 3. No.

We use past actual results as standard and, usually, the previous year's results. Most of our major products which consume the major portion of our labor are produced at a fairly constant rate when in operation.

I realize that our system for labor accounting is not very scientific. We feel, however, that, to establish and keep labor standards current in this ever-changing business, would be a rather formidable and expensive task. For this reason, together with the fact that labor is a relatively unimportant factor in chemical manufacturing costs, we feel that the cost of more accurate accounting would not be offset by a decrease in manufacturing costs resulting from the information a more scientific system would provide.

Reply No. 15—Producer of Industrial Chemicals

Question No. 1. No.

Question No. 2. No.

Question No. 3. No.

Question No. 4. We use actual labor cost incurred by cost center, which is compared with previous month and year-to-date costs. It should be stated that our labor costs are less than 5 per cent of total cost.

Notes on Current Reading

Books

Front Line Cost Administration

W. C. Cooling, Chilton Company, Chestnut and 56th Streets, Philadelphia 39, Pa., $5.00.

The author of this book is the manager of the methods and standards department of an industrial company. To the use of such standards and of incentives related to them, to assist the foreman in his task of first-line management, the work as a whole is devoted. The appendices to the work carry on the theme of its chapters and provide a "Job Description for Foremen," "Performance Review for Foremen," a description of "Setting Production Standards," instructions for using the text of the book for a "Management Seminar," and "Procedure for Installing a New Incentive Plan."

Railroad Accounting and Statistics

Edward H. Bunnell, Watson Publications, Inc., 201 N. Wells St., Chicago 6, Ill., 1955, 272 pp., $5.00.

Subtitled "research and fact finding as aids to management," this book written by a "railroadman" (Mr. Bunnell retired in 1953 as a Vice-President of the American Association of Railroads to which he came in 1934 after nearly forty years in railroad accounting positions), the volume is divided into fifteen not over-long chapters, (among them "The Accounting Organization" and "Maintenance, Operating, and Improvement Budgets"), as well as an appendix of forms.

Governmental Accounting

R. M. Mikesell, Richard D. Irwin, Inc., Homewood, Illinois, Revised edition, 1956, 738 p.p., $8.10.

First issued in 1951, the present edition, as indicated prefatorily has been revised to reflect changes since that date in recommendations of the National Committee on Governmental Accounting of the Municipal Finance Officers Association of the United States and Canada and to incorporate clarifications which the author desired to make. As in the earlier edition, there are two chapters on institutional accounting, covering educational institutions and hospitals, respectively. One of four appendices is devoted to "municipal accounting terminology."

Internal Audit and Control of a Purchasing Department—Research Committee Report No. 2

The Institute of Internal Auditors, 120 Wall Street, New York, 1955, 54 pp., $1.00.

Representing "the ideas and opinions of many people having practical experience in the two fields of purchasing and internal auditing," this report digests and summarizes replies of 100 individuals to whom questionnaires were sent (divided equally between internal auditors and "purchasing men"). Among seven sections into which the study is divided, are "Appraisal of Purchasing Department Operation," and "Control of Purchasing Operations."

Profit Sharing for Small Business

J. J. Jehring, Profit Sharing Research Foundation Evanston, Illinois, Nov. 1955, 53 pp., $1.00.

Directed to companies having less than 100 employees, this pamphlet is condensed in its coverage to the essentials of incentive plans. It is readable. Fourteen "cash plans" and eight "deferred (payment) plans," as well as one "combination plan" are outlined in the latter half of the presentation, which closes with the text of a profit sharing retirement plan. At all points, the study seeks to stimulate the reader to share in the thinking involved.

SELECTED ARTICLES FROM ACCOUNTING PERIODICALS

THE ACCOUNTING REVIEW, *January* 1956 (College of Commerce and Administration, c/o Carson Cox Ohio State University, Columbus 10, Ohio, single copy $1.50)

Benchmarks and Beacons. Howard C. Greer.
Attracting and Maintaining a Supply of Effective Accounting Teachers. Thomas H. Carroll.
The Attraction and Selection of Accounting Majors. C. Rollin Niswonger.
The Attraction and Selection of Accounting Majors. C. A. Moyer.
Price Level Adjustments: Rejoiner to Professor Husband. Raymond C. Dein.
Depreciation — the Development of an Accounting Concept. P. D. Woodward.
*Cost Control as Applied to the Smaller Business Organization. L. J. Benninger.
Legal Decisions on the Accounting for Corporate Surplus. Sidney I. Simon.

THE ARTHUR YOUNG JOURNAL, *January* 1956 (165 Broadway, N. Y.)

Consolidated Returns: Some Pros and Cons. Don J. Summa.
Microphotography In The Office. David Weathersbee.

CANADIAN CHARTERED ACCOUNTANT, *February* 1956 (Chartered Accountants Bldg., 69 Bloor St. East, Toronto 5, Ontario, Canada, single copy $.50)

Inventory Valuation, Recommendations from the final report of the Royal Commission on the Taxation of Profits and Income
*Administrative Accounting. Kenneth M. Place.

THE CONTROLLER, *February* 1956 (2 Park Ave., New York 16, N. Y., single copy $.50)

Preparation for Growth. Thomas T. Arden.
Dynamic Variable Cost Control. Fred G. Tuttle.
The Continuous Inventory. Daniel Z. Tropp.

COST AND MANAGEMENT, *January* 1956 (31 Walnut St. So., Hamilton, Ontario, Canada, single copy $.50)

Plan to Improve Maintenance Costs. G. C. E. Baker.
Some Aspects and Applications of Distribution Costing. Adre Parent.
Efficient Management Needs Expense Control. George Moller.

*Further mentioned in accompanying notes on particular articles.

Manual of Excellent Managements—1955 Edition

American Institute of Management, 125 East 38th St., New York 16, N. Y., 160 pp., 1955, $20.00.

The value bases underlying the assignment of ratings of degree of excellence of managements through the conduct of management audits — a principal activity of the American Institute of Management — are disclosed in this book and related to individual companies throughout the nation. (A scale of 10,000 points in ten categories — not considered equally important — is set up for these audits and a rating of 7,500 points required for excellence). Three hundred and seventy-nine "excellently managed" companies are listed in four report card groupings at the close of the volume.

An Introduction to Economic Reasoning

Marshall A. Robinson, Herbert C. Morton, James D. Calderwood; The Brookings Institution, 722 Jackson Place, Washington 6, D. C., 1956, 335 pp., $3.00.

The first two sentences of the foreword to the present volume contain the reassurance that, "this book . . . is an introduction to economics for . . . adults who have a fragmentary knowledge . . ." In a 10-chapter setup, the progress is from "Problems and Goals" to "Government and the American Economy" by way of "The Econ-

SELECTED ARTICLES FROM BUSINESS PERIODICALS

SYSTEMS AND PROCEDURES QUARTERLY, *February* 1956 (Box 281, Wall Street Station, New York, N. Y., single copy $1.00)

Electronics: Boon . . . or Bane? H. A. Warner.
Internal Control and System Design. Walter W. Merrill.
Waiting Lines in Office Operations. George J. Feeney.
Random Observation. J. Walker Voris.
Writing Standard Practice Instructions. William B. Worthington.

omy and Its Income," "Competition in Our Economy," "Labor and Unions," "Debts and Money," "Prosperity and Depression," "Controlling Business Fluctuations," "Economic Growth" and "International Economic Policy." Average chapter length is some thirty pages in readable format.

Distribution Data Guide — Government Periodicals Issue

U. S. Department of Commerce, Office of Distribution, January 1956, Vol. III, No. 1, 20 pp., $.15.

This issue of the monthly Distribution Data Guide constitutes the "1956 annual listing of all major periodicals published by the Federal Government, which contains facts and figures useful in the field of distribution." The publication of various government agencies listed, include those (applicable to the distribution area) of the Federal Trade Commission, General Services Administration, Securities and Exchange Commission, and the Small Business Administration. Also listed are publications of a variety of business, educational, and professional organizations.

Articles

Cost Control as Applied to the Smaller Business Organization

L. J. Benninger, Accounting Review, January 1956.

The last sub-heading of this article (and applicable to the major portion of its text) is "Cost Control Devices and Procedures Particularly Applicable to the Smaller Business Organization" and concerns forecast income statements, comparison of historical income statements, a budgeting program, and special studies and "spot analyses." Selection among these devices is deemed to be in the guidance afforded by the accountant.

Administrative Accounting

Kenneth M. Place, Canadian Chartered Accountant, February 1956.

This material is a short — three-page — writeup dealing with the use by accountants of communications as a tool and identifies seven means of communications with which "accountants should be thoroughly familiar," with brief discussion of three of them. The approach is that of facilitating assembly and communication of information. The last paragraphs deal with winnowing such information before planning to accumulate it.

The Bureau of the Budget: A View from the Inside

Percy Rappaport, Journal of Accountancy, March 1956.

A measure of surprise very likely awaits each reader of this article, for the history, development, and present status of the United States Bureau of the Budget in the Executive Office, as outlined, suggest a place of behind-the-scenes influence in appropriate areas, which is not general knowledge. The enhanced role being played by prominent accountants in this agency accentuates interest.